

S
622.08
M8r
1792
C-1

STATE DOCUMENTS

Jun 1977

FOURTH ANNUAL REPORT

OF THE

INSPECTOR OF MINES

OF THE

STATE OF MONTANA.

DECEMBER 1, 1892.

JOSEPH HOGAN, - - - INSPECTOR.

JACOB OLIVER, - - - DEPUTY.

HELENA, MONTANA :
C. K. WELLS CO., PRINTERS AND BINDERS.
1892.

EP 4 1997

MONTANA STATE LIBRARY



3 0864 0010 0914 4

FOURTH ANNUAL REPORT

OF THE

INSPECTOR OF MINES

OF THE

STATE OF MONTANA.

DECEMBER 1, 1892.

JOSEPH HOGAN, - - INSPECTOR.

JACOB OLIVER, - - - DEPUTY.

HELENA, MONTANA :
C. K. WELLS CO., PRINTERS AND BINDERS.
1892.

HELENA, MONTANA, December 1, 1892.

TO HIS EXCELLENCY, JOSEPH K. TOOLE,

Governor of Montana:

I have the honor to submit my annual report on mines and accidents in the same, for the fiscal year ending November 30th, 1892.

Also the report of Jacob Oliver, Deputy Inspector of Mines, on accidents investigated by him.

I have personally investigated nineteen fatal and three non-fatal accidents during the past year.

Respectfully Submitted,

Your Obedient Servant,

JOSEPH HOGAN,

Inspector of Mines.

Fourth Annual Report.

CHANGES IN THE LAW.

There is no doubt but that the Legislative Act creating the office of State Mine Inspector was intended to be a benefit to the miners of Montana. That it has benefitted them some I do not think any person acquainted with the facts and the condition of mines at present in the State, will deny.

My experience with a large majority of the men who work mines is that they are perfectly willing to do what is right, according to the law to insure the health and safety of their employes. These men are always courteous to the Inspector and willing to show him everything in and around the mine, and always willing to act on any suggestion made providing it is of any benefit to the employes. The present law is competent to deal with this class of men, but occasionally the Inspector will meet an individual to whom it does not make any difference how he is approached or what argument is advanced to show that the health, and in some cases the safety, of those working for them is endangered, they will not give it a moment's consideration. The only thing is, "What can the Inspector compel them to do?" Under the present law the Inspector has absolutely no power to enforce the law, there being no penalty attached for the violation of it. Under these circumstances he is generally looked upon as an annual trespasser and is only tolerated on the premises through their courtesy.

The present law in regard to quartz mines is inadequate to deal with these people. The only power the Inspector has is to make an examination, providing the man in charge is willing, and if he finds anything wrong he can serve a notice on the person in charge stating the changes necessary to be made. If they feel disposed to make the changes they will do so; if not the Inspector's power ceases, and he has no way of enforcing his recommendation, unless by their neglect to comply with this notice some person should be killed or

crippled, and in a civil action the Inspector would establish this fact, which would be a difficult task in some cases, the management would be guilty of culpable negligence and it would probably be of some benefit to the person injured or to some of his relatives.

Another trouble with the present law is that there is no way of compelling men who work mines to supply their men with air or to ventilate the mines as they should be. In some places men may be found at work where there is hardly enough air for a candle to burn; the Superintendent is notified every time, but in some cases it has no effect. There should be a law compelling persons who work men under ground to supply them with a reasonable quantity of pure air. With the modern ways of ventilating this could be done at a very little cost, and would be a benefit to the employer as well as to the employee, as it is physically impossible for a man to do the required amount of work in foul air. And it seems to me to be a God-given right to all men to breathe pure air. The average miner in good health has all he can do to support himself and family on the wages he receives and can ill afford to be idle very long at a time. But the fact is that he can not work but a short time in bad air when it begins to tell on his health, and in case a person should die in the mine from the effects of bad air, it would be termed heart disease, or something else. Surely the men who endanger their lives each day by going down in the mines to toil and dig the wealth from the earth are deserving of some consideration.

Another thing that deserves attention is the working of men in mines where there is but one outlet, and that is the hoisting shaft. Generally over this shaft a shaft house is erected, that at any time might take fire, thereby cutting off all means of escape, and the men would be entombed in the mine and smothered to death. Of course, in sinking a shaft, the driving of crosscuts and some drifting must be done before another outlet can be provided, but there should be no unnecessary delay in providing one that could be readily traversed. There is a law that requires safeties and a bonnet on all cages or skips in vertical shafts that are worked below a depth of 300 feet, but there is no provision made for an incline shaft. They may be worked to any depth without having any of these appliances. I think the same should apply to incline shafts especially, where men are hoisted and lowered into shafts there is no telling when the cable might break which would mean instant death to any one being hoisted or lowered.

There are a great number of men employed in the mines of

Montana, and I think it the duty of the State to protect their lives and health as far as it is practical to do so. While it is impossible to prevent accidents in mines, the number can be reduced, and the sanitary condition of the mines improved, if our Legislature would pass a good law and provide it with a penalty so as to make it operative, and give the Inspector the right to enforce it and make it his duty to do so.

There certainly are a number of mines that will come up to the anticipations and requirements of any reasonable law. While I do not think it is right to place too much power in the hands of the Inspector, I do think that after he has made an examination of any mine, and notified the management of any changes necessary to be made, in case they do not comply with the recommendations in a reasonable time, then give the Inspector the right to establish the fact, in the District Court, that these changes are necessary, then let the Court restrain the place from being worked until the order of the Inspector is complied with. In this way both sides could have a hearing and none of the parties could claim they had been unjustly treated.

I think such a law would meet with the approval of the mine owners as well as the miners, and would have a wholesome effect in rectifying many things around the mines of the State and would be a physical benefit to those who work under ground for a living.

THE COAL MINING LAW.

The last Legislature passed a law regulating the mining of coal in the State, that has worked very satisfactorily to the coal miners and to the men who operate coal mines. It gives power to the Inspector to enforce the provisions of the law, and while some of the mines did not come up to the requirements at the time the law was passed, and it took some time to make the necessary changes, yet those changes have been made with little inconvenience to the management and to the benefit of all the employees.

At the present time the coal mines are pretty well ventilated and their condition much improved. The men are furnished with all

the props required to secure themselves, and there was but one accident—caused by a fall of slate—during the past year.

MINING IN MONTANA.

The same general depression has been felt throughout the State, owing to the low price of silver. While most of the mines have been worked to their full capacity and several properties have been leased and bonded, and the mills and smelters report large shipments of custom ore, there is not that activity about mining that was anticipated in the spring; but the general feeling is that this depression will not last long. A good market for silver is what is required most, as the ore can be obtained in any quantities from our silver mines. In many cases good claims are so located that it requires all the profit to ship and treat the ore.

Our copper mines still rank first as the greatest copper mines of the world, and have aided materially in the prosperity and mining interests of the State. They have been worked on a large scale and have given employment to a great many men. The capacity of the coal mines has been increased, and the output of coal and coke will exceed that of last year. Taking it as a whole the mines are in a very prosperous condition and have given employment to about 10,000 men. About 1,500 of these are employed in coal mines and 8,500 in quartz mines.

I think that the condition and system by which most of the mines of the State are worked is good, and there is nothing that human ingenuity can devise for the safety of men underground but what can be found in use at some of the mines.

ACCIDENTS.

Considering the number of men that are daily employed in the mines of Montana the number of accidents are small, and the per-

centage much below that which is obtained in other mining States. Some of the accidents occur in such a way that it is a difficult matter to foresee or guard against them, while others are probably due to oversight on the part of the management, and a few of them can be traced to the neglect of the men themselves. In some cases that I investigated, if the men had used ordinary precaution for their safety they might not have met with injuries, and the management should provide them with everything necessary to guard against accidents.

LIST OF FATAL ACCIDENTS.

Date.	NAME.	County.	Name of Mine,	Occupation.	REMARKS.
Dec. 16, 1891.	Benjamin Cox.....	Deer Lodge.....	Combination	Miner.....	Killed by explosion of powder.....
Dec. 23, 1891.	Fred S. Clark.....	Deer Lodge.....	BI-Metallic	Miner.....	Killed by fall of ground.....
Jan. 11, 1892.	Henry Kressin.....	Silver Bow.....	Star West.....	Car man.....	Killed by falling from ladder.....
Jan. 14, 1892.	Samuel Layin.....	Deer Lodge.....	Granite Mountain	Miner.....	Killed by blast.....
Jan. 18, 1892.	Hank Shiller.....	Deer Lodge.....	Granite Mountain	Miner.....	Killed by explosion of missed hole.....
Jan. 20, 1892.	Alonzo H. Perrin.....	Silver Bow.....	Glengarry.....	Laborer.....	{ Killed by air box slipping through the rope while being lowered in shaft.....
Feb. 13, 1892.	John Oberender.....	Cascade.....	Sand Coulee	Coal miner	Killed by fall of slate.....
Mar. 16, 1892.	Benjamin Treloar.....	Jefferson.....	H. & H.....	Miner.....	Killed by fall of ground.....
Mar. 28, 1892.	John Silpenti.....	Jefferson.....	Alta.....	Mule driver	Killed by cave.....
April 6, 1892.	John T. Flynn.....	Deer Lodge.....	Combination	Car man.....	Killed by being caught by cage.....
May 5, 1892.	James Main.....	Park.....	Rocky Fork Coal Mine.....	Mule driver	Killed by car striking him
May 14, 1892.	Angus Melver.....	Lewis and Clarke.....	Drumhannon	Miner.....	Killed by rope breaking on giraffe.....
May 14, 1892.	William Minkie.....	Lewis and Clarke.....	Drumhannon	Timberman	Killed by rope breaking on giraffe.....
May 14, 1892.	James Abbotte.....	Lewis and Clarke.....	Drumhannon	Miner.....	Killed by rope breaking on giraffe.....
May 19, 1892.	Andro Pavol.....	Park.....	Park Coal and Coke Co.....	Coal miner	Killed by car running over him.....
June 27, 1892.	W. F. Cover.....	Deer Lodge.....	Granite Mountain	Car man.....	Killed by fall of ground.....
Sept. 12, 1892.	W. F. Roberts.....	Deer Lodge.....	Granite Mountain	Miner.....	Killed by fall of dirt
Oct. 5, 1892.	H. B. Smith.....	Deer Lodge.....	BI-Metallic	Miner.....	Killed by premature explosion.....
Nov. 29, 1892.	Alex. H. White.....	Jefferson.....	H. & H.....	Top car man ..	{ Killed by engineer holsting cage above the collar of the shaft and against the top of the gallows frame and sheave wheel.....

LIST OF NON-FATAL ACCIDENTS.

Date.	NAME.	County.	Name of Mine,	Occupation.	REMARKS.
Jan. 14, 1892.	Wm. A. Butler.....	Deer Lodge.....	Granite Mountain	Miner.....	Injured by blast; received several flesh wounds.....
Jan. 18, 1892.	Maurice Cahill.....	Deer Lodge.....	Granite Mountain	Miner.....	Right arm amputated; caused by explosion of missed hole.....
April 20, 1892.	Daniel O'Connell.....	Silver Bow.....	Mountain Chief.....	Miner.....	Ankle dislocated and knee hurt by fall of ground.....

On the 16th of December, 1891, at about half past four a. m., Benjamin Cox, a miner, employed by the Combination Mining and Milling Company in the Combination Mine, at Black Pine, sustained injuries from which he afterward died. He was at work in what is called the north stope, about ninety feet from the surface, at the bottom of the Barret shaft. Wallace La Dernie and John L. Thompson were at work in the stope a short distance from him. When they had the holes ready to blast, Thompson went for the powder which was about four hundred feet from where they were at work. When he returned he found Cox in a kneeling position preparing the fuze. He had a cap on one piece of fuse and was looking in the dirt for two caps which he told Thompson he wanted to find. Thompson placed three sticks of powder about two feet from Cox, which Cox wanted to use in loading the holes. Thompson then left him to go to his work and had gone about one hundred feet when he heard the explosion. Wallace La Dernie and Thompson went immediately to where Cox was and found him badly mutilated from the effects of the explosion. Although he lived several hours afterwards he never made any statement as to how the explosion occurred or what caused it.

I think in scraping around through the dirt looking for the caps he, by some means, exploded one of the caps on the ground, or else he had found a cap and in crimping it on the fuse it exploded. In either case the powder being so near the force of the concussion would explode it. It is a very unsafe practice to have powder around when fixing caps on fuse.

On the 23d of December, Fred. S. Clarke, a miner employed by the Bi-Metallic Company in the Bi-Metallic Mine, at Granite, was instantly killed by a fall of rock. Clark and Tim J. Shea were working in a stope over the east drift on the first floor of the four hundred foot level, and had worked there some time previous to the accident. It was customary for them to run the dirt they broke during the day. At about a few minutes of five o'clock Clark went up in the stope and commenced picking out the first-class ore. Shea was shoveling the waste back and was but a few feet away from Clark. Clark, who was in a kneeling position, had been there but a short time when a boulder of rock, weighing about three tons, came away from the hanging wall striking Clark and killing him instantly. Shea escaped with a few scratches. The rock was very thick in the center and running to a thin edge all around. The edge was on the floor and the slab of rock reached to about five feet above the floor.

There was a talc seam in the hanging and that was what caused the ground to give away. The hanging wall about twenty feet back had not been good and the ledge at this place was rather flat. It did not pitch as much as in the other parts of the mine. They had driven through this bad ground and it was well timbered. The hanging wall, in the part of the stope where the accident occurred, appeared to be good. It was very solid and with the exception of the slab that fell on Clark would have required a blast in order to have it come down. It was timbered as close as possible, the timbermen having put in a set of timbers that afternoon. Shea said that they had sounded the ground and thought it perfectly safe.

On the 11th of January, 1892, Henry Kressen, a car man employed by the Arlington Mining Company in the Star West Mine (Butte) met with an accident that cost him his life. He was working on the west end of the mine and went down the west shaft which is down 100 feet. A bucket is used for hoisting. When the men were going to work they concluded to climb down the ladders. John Thomas was first to start, Henry Kressen next and they were followed by Richard Grentell and Richard Morsehead. At about a depth of 50 feet there are some boards around this compartment of the shaft so that persons going up or down might rest, still leaving room so that a man can go up or down the ladders. When Thomas reached this platform he stepped off. As he did so, Kressen, who was about 15 feet above on the ladder, lost his hold and fell, striking the platform, and went over into the hoisting compartment, and was found at the bottom of the shaft, a distance of about 65 feet from where he fell. He lived about one-half an hour after being brought on top, but could not speak. Therefore he made no statement as to what caused him to fall. The ladders were in good condition. There was nothing wrong about them that would cause such an accident. The morning was very cold and the snow and ice on his boots might have caused him to slip, thereby losing his hold.

On the 14th of January, 1892, Samuel Lavin, a miner employed by the Granite Mountain Mining Company, in the Granite Mountain mine, at Granite, was instantly killed, and William A. Butler received some flesh wounds that were very painful.

They were working in a crosscut that was being driven north from the east drift on the 1300-foot level, and had drilled nine holes during the day. These they loaded with five others that had been blasted by the other shift, but did not break, making fourteen in all. Mr. Butler says that Lavin proceeded to spit the holes, and he was

counting them, starting at the bottom hole and going up. When he got through with the last one Butler, who was standing on the right, stepped to the left and told Lavin he had spit but thirteen holes. They both looked for the fuse that was not spit. Lavin found it and spit it. They then started out but had just turned around when one hole exploded. Butler was knocked over a pile of dirt. He claims to have crawled out about 90 feet before any of the other holes exploded. Lavin's body was found about 15 feet from the face of the crosscut. Butler said he did not think it was over one-half a minute from the time the first fuse was spit until the explosion of the hole that caused Lavin's death. The fuse used was tripple tape, and if it were all right the fire would go through it at the rate of two feet per minute. This would give them three minutes from the time of spitting until the holes would go off if the fuse was of the required length—six feet. There is a man employed at this mine who cuts the fuse and puts the caps on them. He said the fuse he gave them was six feet. Butler stated that Lavin cut about 18 inches off the first fuse and shorter pieces from some of the others so as to make sure that certain holes would explode first to give a chance to some of the others to break, but with $4\frac{1}{2}$ feet of fuse there would be more than one-half a minute from the time of spitting the holes and the explosion. Fourteen holes are too many for one man to spit, as the time occupied in firing them is apt to be much longer than those engaged in the work think, and there might possibly be a faulty place in the fuse so that the fire would go through it very quick. A battery could be used or pieces of candle could be placed against the fuse, so that the tape or wrappings around it would ignite. In either case men would not be subject to such accidents, and by this similar ones would be prevented.

On the 18th day of January, 1892, Hank Shifler and Maurice Cahill, employed by the Granite Mountain Mining Company in the Granite Mountain Mine, met with a very serious accident resulting in the death of Hank Shifler and on the same day at four p. m. Maurice Cahill had his right hand injured so that it had to be amputated below the elbow, and he also received other injuries about the shoulders. These men were at work driving a cross-cut north from the shaft on the seventeen hundred foot level. It was their first shift in this place. After picking down some ground and shoveling back some dirt, Shifler took the scraper and put it into the hole that was drilled down about five inches and said to Cahill they had just as well drill this hole down. Cahill took a drill and put it in the hole and Shifler commenced striking. He struck the drill six or eight

times when the hole exploded, driving the drill through Shifler's head, and both were struck by the flying debris. Cahill says that the hole was round and that the ground around it showed no signs that would lead them to think it had been blasted. He also said the explosion was something terrific, and broke considerable ground. He thought there was quite a charge of powder in it.

This accident occurred on Monday, and the last work done in this place was done on Saturday. The two men that worked there on Saturday said they loaded and fired the two holes they drilled and that both of them exploded, as they heard the reports before leaving the station. While it seems reasonable that a miner could tell whether a hole had been blasted or not, and that the rock around it would show some sign, I am of the opinion that the hole was blasted, but that all the powder did not burn, just enough to break the collar of the hole and blow the tamping out. It seems strange that Shifler did not find this out when he put the scraper in the hole, or that Cahill could not tell that the drill he was turning was not in solid ground. He told me he thought they were drilling in solid rock.

On the 20th of January, 1892, Alonzo H. Perrin, employed in the Glengarry mine, at Butte, met with an accident that caused his death. Perrin, with Thomson Brown and John Atkins, was at work putting in air boxes in the pump compartment of the shaft between the 350 and 450 foot levels. The boxes were made of one-inch plank and were twelve inches wide and ten feet in length. They were being lowered down from the 350-foot level with a rope to where they were used in the shaft. Atkins was up on the station and lowered two boxes down to Brown and Perrin. They made the rope fast to the timbers and took one box and put it in, and proceeded to lower the other one to where it was required.

Perrin was below it and when it was within a few feet of him it slipped through the rope, striking Perrin on the back of the head and causing injuries from which he died four days later.

On the 13th of February, 1892, John Oberenier, a coal miner employed by the Sand Coulee Coal Company in their mine at Sand Coulee, was fatally injured.

He was employed as machine runner. The Harrison mining machine is used in this mine for cutting the coal. Oberenier, with his partner, T. Burgreen, had taken the machine in room No. 11 on the Butler entry and started a break through the pillar to go through to the next room. They were at work but a short time when a

miner came along and told Oberenier to sound the roof. He did so and took down some loose draw slate. Then he sounded the other draw slate and told his helper he thought it was all safe. He again started the machine and had worked but a short time when two pieces of draw slate fell. He was in a sitting position running the machine. He sustained injuries on the back and hips from which he afterward died. He had worked some time in the mine and was considered a practical miner.

On March 16th, 1892, Benjamin Treloar, a miner working in the H. and H. mine at Placer, received serious injuries by a fall of ground, from which he died that same night. He was at work in stope No. 2, on the 300-foot level.

On the night of the accident J. H. Hamilton, the night boss, passed through the stope at about 7:30 p. m., and went through under the bottom of the stope where Treloar was working. He noticed some loose ground about 10 feet southwest of where Treloar was supposed to work, and he called Treloar's attention to it. He told him to take this loose ground down and be careful of it. This place was filled with waste within three or four feet of the back, and a man would have to get down on his hands and knees to crawl through. At about 8 p. m. Richard Berryman, who was at work about fifty feet from him, heard him calling, and he went to see what was the matter. He found Treloar covered with the fall of ground. He made no statement as to what he was doing in where he got hurt, as it was not where he was supposed to work. Beside him there was a candle box containing a bottle of medicine and a teaspoon. It is probable that he went there to take some medicine, as in the evidence produced before the coroner's inquest there was nothing to prove he was working there when he got hurt.

March 28, 1892, John Siipoali, employed as a mule driver by the Helena & Livingston Reduction Company in the Alta mine, near Wickes, was instantly killed by a cave of ground. He was at work loading a car of dirt in No. 8 tunnel, at a place called the "turn out," about 1,000 feet in from the mouth of the tunnel.

Two timbermen, August Miller and James Ginloe, were at work repairing the timbers and putting in new lagging. They were putting in a set of timbers and had them lagged. The lagging was about 8½ feet in length. Miller was standing about four feet from Siipoali when the ground on the back of the tunnel caved. A large boulder weighing 5 or 6 tons, and several tons of dirt fell on the lagging. The boulder struck the cap and knocked it two feet out of

place. The lagging and dirt came down burying Siipoali. Miller said while the ground over the tunnel looked bad they did not think it would cave. They did not have the girts in against the cap. If they had I do not think it would have been knocked out of place. But there were other old timbers they were going to take out, and it is more than likely that that amount of dirt and the boulder would have broken the lagging and the result would have been the same.

On the 6th of April, 1892, John T. Flynn, a car man employed by the Combination Mining and Milling Company, at Black Pine, received injuries from the effects of which he died on the 13th of the same month. At one o'clock John T. Flynn, P. T. Harrington (station tender), David Ballentine (mine foreman), and D. Carpenter got on the cage of the Harrison shaft to be lowered to the bottom. As the cage was about to leave surface the mine carpenter requested them to send the cage back as soon as they got to the bottom. After they were lowered to the bottom, Harrington said after waiting a reasonable time he called out, "All clear?" Ballentine answered, "All clear." Then Harrington gave the hoisting signal. In the mean time Flynn climbed up on the first set above the station and was reaching out over the bonnet of the cage to disconnect the cable from the cage, as he was going to use the cable to draw the cars up the incline to the station. When he saw the cage moving he reached for the bell rope, but lost his hold and fell between the edge of the bonnet and the timbers in the set. After the bonnet passed above him he fell on the floor of the cage. As soon as the men saw what had happened they signaled the engineer and he stopped the cage.

The cage had not got under full speed and did not move over eight feet from the station. If Flynn had leaned back against the timbers the accident might not have occurred. Evidently he did not know that the cage was to go on top, or that the signal to hoist had been given.

On the 20th of April, 1892, Daniel O'Connell, working for Sullivan & Company, at the Mountain Chief Mine, received some painful injuries. He was at work in the west drift on the five hundred foot level, and a slab of ground fell, striking him on the legs. His right knee was hurt and his left ankle dislocated. The drift was well timbered with sets and lagged, and were as close as possible to the place where he was at work without taking out more ground. The ground fell from the back of the drift and was a slab with a talc seam behind it. He must have gone in and started to work without sounding the ground to see whether it was safe or not.

On the 5th of May, 1892, James Main, employed by the Rocky Fork Coal Company, as mule driver in their mine at Red Lodge, was instantly killed while trying to couple a mine car to some others standing on the switch. He came out with four loaded cars at switch No. 2, in mine No. 4. A number of loaded cars were standing on the track. Main was supposed to couple the cars he brought out with those standing on the track. He tried to make the coupling before the cars stopped. While in the act of coupling the cars his head was caught between them and was badly crushed, causing instant death.

He could have made the coupling after the cars came to a stand-still without any danger, the only difference being he might have to push back the four loaded cars from those standing on the switch.

On the 14th of May, 1892, Angus McIver, William Minkle and James Abbott, employed by the Montana Mining and Milling Company, Limited, in the Drum Lummon Mine, at Marysville, met with an accident that resulted fatally to all three of them. Angus McIver and James Abbott were miners, and William Minkle, a timberman. They were working in what is called the nine hour stope, about 375 or 400 feet up from the 400 foot level. The men in going to work had to go through the 400 foot level and then go up about 375 feet to the place where they were to work. There is a small engine on the 400-foot level with a $1\frac{1}{2}$ inch manilla rope run through a pulley upon the stope used for hoisting timbers and tools up to where the men were working. The tools, etc., were put in a box made of sheet iron 6 feet long by $2\frac{1}{2}$ feet wide called a giraffe. This was pulled up the incline. The incline pitches about 80 degrees. The company had a notice posted at the bottom forbidding employes from riding on the giraffe.

After lunch on the night of the accident these three men got in the giraffe to go up to their work. When they had gone about 100 feet the rope broke and the giraffe with the men fell back to the 400 foot level, resulting fatally as above stated. When I visited this mine last year I called Mr. Henley's (the foreman) attention to the fact that there was no safety appliances on it and that men should not be allowed to ride on it. He said they were for hoisting timbers and men were forbidden to ride on it. Yet rather than climb up the ladder road, which was very good, the men made a practice of riding up and down on the giraffe. Some of the evidence at the Coroner's inquest showed that the night foreman and nearly all others used to ride on the giraffe.

The rope had been in use about two months and while it seemed

to be very good it had probably been stretched beyond its elastic limit by the stulls catching on the incline while being pulled up or in some other way stretched to a breaking strain. I do not think it could possibly break with the weight of three men. However it is not safe for men to ride on such appliances and they should not have done so.

On the 19th of May, 1892, Andro Pavol, a coal miner employed by the Park Coal and Coke Company in their mine at Horr, received injuries from which he died on the 21st of the same month. He was working in a room with Joe Harieke. The vein pitches some in this part of the mine. They had a loaded car in the room. It is customary in this part of the mine for the miners to run the loaded cars out and bring the empty ones in. The loaded cars are run out with a rope twisted around a post, called by coal miners a "snubbing post." Sometimes one man gets in front of the car to keep it from getting off the track while the other tends to the rope that is around the post. On this occasion Pavol got in front of the car and knocked the brace that was under it out. By some means his partner neglected to hook the rope on the car. The car started and Pavol could not hold it or get out of the way, and it ran over him.

On the 27th of June, 1892, at about eight p. m., W. F. Cover, a car man employed by the Granite Mountain Mining Company, in the Granite Mountain Mine, at Granite, was instantly killed by a fall of rock. He was filling a car at the time, in the west drift, No. 13 level. The ledge formation was drifted on close to the foot-wall for some distance from the shaft, then there was a cross-cut run south through a strata of granite and ledge formation to the hanging wall where a streak of quartz was cut, and they were drifting on it. There were no timbers in this cross-cut or from it to the breast of the drift, at the time the accident occurred. I did not get there to make an examination until the 2d of July. In the meantime they had put in five sets and lagged them. Where the quartz fell from was timbered also.

Jesse J. Taylor and Fred. Divel, miners, were working in the drift when the accident happened. They stated that they had examined the back of the drift at different times, and the place where the rock fell from on the night of June 25th, and had sounded and examined the ground within four or five feet of this particular place on the night of the 27th, and thought it perfectly safe.

Frank Mitchell and John H. Mitchell, miners, working in the drift on the day shift, stated that they had examined and sounded

the ground on June 27th, and took down all the loose ground, and considered that the roof was sound and was not dangerous to any one working in that part of the level. Had been in the habit of examining the ground and did not at any time believe it to be unsafe.

W. F. Cover was not an experienced miner. He was employed as a laborer. He had worked but sixteen shifts in the mine, consequently his safety depended entirely on the men in charge and those working with him in the drift, as he, probably, would not know whether he was exposed to danger or not.

While quartz as a rule will hang well, there was a talc seam on the wall and gouge that might cause some parts of the ledge to give away after being shook by a blast. Timbers should be put in place where there is room for them, instead of running ahead with the drift and afterwards timbering, thereby avoiding accidents of this kind.

About eight a. m., on the 12th day of September, W. F. Roberts, a miner, was instantly killed in the Granite Mountain Mine, at Granite. The accident occurred in the west drift about twenty feet from the face, on No. 17 level.

Roberts was working at the breast of the drift with J. C. Williams. August Lamberg and W. F. Pearson, two timbermen, had started to cut out for a set of timbers about twenty feet back from the breast of the drift. They claimed to have taken down all the loose ground that they could and then started to drill to make room for the posts. Shortly afterwards S. T. Kyle, the foreman, and A. D. Marshall, the shift boss, went through this part of the mine and sounded the ground. They told them to take down some ground over where they were working, in the breast of the drift, and this they did. Roberts went back to where August Lamberg and W. F. Pearson were at work to get the air hose. Had just taken hold of the hose and was returning with it when about 500 pounds of dirt fell from the back of the drift, striking him on the head and neck, causing instant death. Lamberg and Pearson said they had sounded the ground and thought it perfectly safe. Roberts was an old miner and had worked but three shifts in the mine, but had been working in the mill at Granite for some time.

On Oct. 5th, 1892, H. B. Smith, a miner employed by the Bi-Metallic Mining Company in the Bi-Metallic mine, at Granite, was instantly killed by a blast. Smith and John Tunnell were at work in the west drift of the 1300-foot level. They had loaded nine holes and were preparing to blast them. The fuse was cut by the powder

man and was six feet in length. The kind of fuse in use was Eva's improved water fuse, triple tape, which burns at the rate of 2 feet per minute. Tunnell stated that they cut about six inches off of the fuse that was used in the cutting in holes. These they wanted to explode first to give the others a chance to break. The drift was wet and they commenced to spit the holes. After firing the fuse that were in the bottom holes, the drift got pretty well filled with smoke, and they could not readily find the fuse that were in the back holes.

Tunnell requested Smith to leave them, but Smith said they would find them. They completed firing all the fuse, but before they had turned to leave one of the holes exploded knocking Tunnell down. He received some slight flesh wounds. He said his legs were covered with some of the dirt that the hole broke, but he got up and tried to pull Smith out with him. He called to him but received no reply. He started out, but fell over some boards and waste that were in the drift, and remained there until the other holes exploded. He could not say how long it was from the time the first hole was spit until the shot went off. If the fuse was $5\frac{1}{2}$ feet long, as stated by Tunnell, it would give them $2\frac{3}{4}$ minutes to fire the fuse and get out of the way. It is probable that when the drift got full of smoke they remained there longer than usual looking for the fuse.

Smith's body was found covered over with dirt that the holes broke. Tunnell was very fortunate in escaping without serious injuries.

On the 29th of November, 1892, at about 3:40 a. m., Alexander H. White, employed at the H. and H. mine, near Placer, for the Custer Mining Syndicate, was instantly killed by the cage being hoisted up against the gallows frame and sheave wheel. White was running car on top. He also run the ore from the shaft out to the ore house. The ore is hoisted to No. 2 level, which is a tunnel run in the hill from the ore house and connects with the shaft at a depth of seventy feet. The waste is hoisted to the surface through the main shaft. When ore was being hoisted White would go down to No. 2 and run it to the ore house. On the night above stated White took the lantern that was in use at the collar of the shaft. He generally hung it on the cage when coming up, so that the engineer could see it. The cage would not come up unless they were going to hoist waste, and then White would come up with it.

Daniel R. McDonald, the engineer on duty when the accident occurred, stated that White always hung the lantern on the cage and when he would see the light coming out of the shaft he would

stop the engine. The signal at the mine was three bells for hoisting men and one for hoisting waste, but McDonald said that White used to come up as often on one bell as three and he was always aware that White was on the cage.

On the morning of the accident McDonald received a signal to hoist from No. 2, and says he was watching to see the light come out of the shaft, and the first thing he knew the cage struck against the sheave. The car that was on fell down on the turn sheet at the collar of the shaft and White fell down the shaft. His body was found at the 300-foot level. The car and cage were broken by striking against the top of the gallows frame and sheave wheel.

The engineer claimed it was quite dark when the light that stood at the top of the shaft was gone. The lantern that White took down to No. 2 was on the cage, and must have quenched, for it was found on top at the collar of the shaft.

They have an indicator on the engine, but it seems the engineer was watching for the cage to come out of the shaft, but did not see it.

BEAVERHEAD COUNTY.

There has been a good deal of work done in the different mining camps of this county during the year.

At Dewey's Flat, Lion City, Bannack, and vicinity mining has been carried on quite extensively. The old mines have been worked continuously, and many new ones developed with very satisfactory results, giving employment to about four hundred and twenty-five men.

This County is ranked with the mineral producing counties of the State.

LION CITY.

The Cleve mine, owned by the Hecla Consolidated Mining Company has been worked at intervals for the past fifteen years. The incline sunk on the lead is down 900 feet from surface, with drifts driven, and some stoping done. The walls of this mine are fairly

good, only requiring timbering in places. The ventilation, where the men were at work, is good, as they have an independent air course to surface besides the incline.

John Hull, foreman.

The Cleopatra mine is owned by the same company, and has been worked constantly for the past fifteen years. The main incline is down 3,300 feet. The ore lies in chutes varying in height and thickness. There is a tunnel run in that taps the incline at the 1800-feet. This mine is timbered with sets and a number of cribs and long stulls are used. In most parts of this mine where men were working the air was good. The hanging wall is pretty good, and while there has been an immense quantity of ore stoped out during the time the mine has been in operation, they have had no trouble with it yet. During the past year they have retimbered a good part of the mine with sets of strong round timbers and built some cribs.

The ore from these properties is treated at their smelter at Glendale.

D. H. McMasters, foreman; S. A. Barbour, Superintendent; H. Knippenberg, General Manager.

Some work has been done on the Trapper, Mt. Sheep and True Fissure.

BANNACK.

The Golden Leaf mine is situated about one mile below Bannack, and is owned by the Golden Leaf Mining Company. This property has been worked for the past three years. Two tunnels are driven in the hill, the principal work being done on the lower one, which is in 600 feet. Connections have been made to surface. The air is pretty good. Very little timbers are used, or waste to fill with where the ore is taken out. The ore is treated at the company's mill near the mine. John R. Gilbert, Superintendent.

The Delmonte and Bonaparte mines are in the Blue Wing mining district north-east of Bannack. Also the Mountain View which has a shaft sunk to the depth of 130 feet.

Some work has been done on the Comet Mountain, the Elkhorn, San Francisco, the Meteor and the Guy.

Lone Pine mine, at Dewey's Flat, is owned by an English company, and is one of the most promising of Beaverhead county. The

shaft is down about 900 feet. A twenty-five stamp mill is kept going constantly on the ore taken from this mine.

CASCADE COUNTY.

Mining coal is the principal mining done in this county. The Sand Coulee coal mines are located about twelve miles from Great Falls, and are one of the largest coal producers of the State.

On Deep Creek, about twenty miles southwest of Sand Coulee, the Sand Coulee Coal Company is opening up some coal.

At Belt and Armington there has been considerable work going on prospecting the coal seam, and the small mines have been worked there to supply a local trade.

The coal mines of Cascade County give employment to about 500 men.

The vast smelting plant of the Boston and Montana, located at Great Falls, has been in operation during the past few months.

The Great Falls smelter is kept going constantly on ore supplied by the surrounding camps.

SAND COULEE.

The Sand Coulee coal mines are operated by the Sand Coulee Coal Company. These mines have been worked for some time and have a large number of entries driven, and are working rooms from them. The mine is worked on the double entry system. The roof or hanging wall is pretty good. Not many timbers used except in the rooms, and those that are used are not heavy. The vein is a blanket vein, the average thickness being about eleven feet. About six feet of this is worked and shipped as merchantable coal. Their principal trade is supplying the railroad; besides, they have a good local trade. When working to their full capacity they produce 1,400 tons per day. They do not work steadily and the output for the past year averaged about 1,000 tons daily, for which they have a ready market. The mine is ventilated by two fans that force the air in and through the workings. These fans are capable of supplying a large quantity of air. The main entry or roadway is the outcast for

the mine. On each side of this is driven an air course. The fans drive the air through the different workings and around through the main entry. By this means each side is ventilated separately and the air does not have to travel so far before it gets to the return, and the loss of air through breakthroughs, not bratticed air tight, and from friction, is not as large as it otherwise might be. The currents of air are conducted around the face of the workings pretty well and the mine is very well ventilated. The rooms are kept well supplied with props, and the entries, where occasion required, are timbered with posts and stringers.

This company gives employment to 450 men in and around the mine. H. Burrell, Manager.

DEER LODGE COUNTY.

This county ranks well up among the mining counties of the State, giving employment to about twelve hundred and fifty men in its mines. As a silver producer the mines of Granite are second to none in the State except Butte.

There are a number of mines located around Granite, Phillipsburg and Champion that were worked in the fore part of the year, but were not working when I visited this district and therefore are not mentioned in this report.

The Zosel district worked a number of men for a time, but have not done a great deal there of late. Those familiar with this district are of the opinion that this slackness will be only for a time.

Besides the mining in this county, at Anaconda the vast smelting plant of the Anaconda Company has been running steadily with ore supplied from the company's mines at Butte, giving employment to a large force of men.

GRANITE.

The Granite Mountain Mine is worked by the Granite Mountain Mining Company.

The shaft, a three compartment, is down to what is called the

seventeen hundred foot level. There are two tunnels run in the mountain, the farthest up of these being about two hundred feet above where the shaft is sunk. Levels are driven to the seventeen hundred and connections made from the thirteen hundred to the surface. Stations are cut at the fourteen hundred and seventeen hundred foot levels, the ledge cross-cutted and were drifting on it.

Above the thirteen hundred foot level the work of stoping out the ore was in progress. In the lower levels, where the ledge was being prospected, not much timber is used, but before they commence stoping on them they are timbered with sets. In the stopes half sets and stulls are used, excepting when very wide sets are used and kept pretty well filled with waste. Above the thirteen hundred foot level where men were at work, the air was fairly good. Below this it was not so good.

During the past year the shaft has been re-timbered from the six hundred foot level to the surface, and a large new engine with all modern improvements, twenty-eight by seventy-two inch cylinders; also, double deck cages and one-half by seven inch cables have taken the place of the old engine.

There has been considerable improvements made in and around this mine during the past year that adds greatly to the safety of the employes. A. D. Marshall, foreman.

The Cleaveland shaft is worked by the same company with W. D. Dodds as foreman. The shaft is down 447 feet, with a station cut, and cross-cuts driven, and some drifting done. The shaft is sunk with the intention of having it connect with the tunnel they are driving from Rumsey, in order to connect with the fourteen hundred foot level of the Granite Mountain Mine, a distance of about 8600 feet.

The tunnel is seven by eight feet in the clear. It will be used as a roadway to run the ore from the mine to the mill, instead of the present way of conveying it by tramway. This tunnel will give a good drainage to the mine, besides, it prospects a number of mining claims belonging to the company.

The Granite Mountain Company gives employment to four hundred and forty men, and the ore from the mines is treated at their mills at Granite and Rumsey. Thomas Weir is superintendent.

The Bi-Metallic Mine is worked by the Bi-Metallic Mining Company, with Col. W. T. Hart as superintendent.

A three compartment shaft is down fourteen hundred feet, timbered with twelve by twelve inch timbers, with stations cut and levels driven to the fourteen hundred. Were cutting the station at the fourteen hundred when I visited the mine.

The different levels are connected with uprisers from the eleven hundred to surface. The cross-cuts and drifts are well timbered with sets of strong, round timbers, and the stopes are timbered mostly with the same, and as they are worked out are kept well filled with waste.

There was no stoping going on below the thousand foot level. The mine is well ventilated and well timbered; the timbers being put in as soon as there is room for them. The men are supplied with everything necessary to secure themselves, and to guard against accidents. A large Knowles pump is used to cope with the water. Cages, six and one-half inch cable and twenty-two by sixty inch cylinder engine for hoisting. James Willoughby is foreman.

The Fanny Parnell shaft, No. 4, is worked by the same company and under the same management. Was down 615 feet and were still sinking. Stations have been cut at the two hundred and 515, with cross-cuts and drifts driven. The mine is well timbered and fairly well ventilated. Mike Riney is foreman.

The ore taken from these mines is treated at their mill near Phillipsburg. It is conveyed in buckets on a tramway from the mine to the mill.

This company employ three hundred and fifty men in and around its mines.

The Bi-Metallic Extension Mine. This mine has been worked for the past three years by the Bi-Metallic Extension Company.

A two compartment shaft is down 450 feet—timbered with ten by ten inch timbers. A station has been cut at the 450 and the only work being done when I visited it was cross-cutting. The air was fair, although they had no connections with surface but the main shaft. Cage, one inch rope and small engine for hoisting. Work eleven men. James Patton is superintendent.

PHILIPSBURG.

The Hope mine has been worked for years. The principal work being done at present is through the Jubilee tunnel, which is driven in the hill about 1,600 feet, where some drifting has been done and

a chute of ore cut, and they were stoping it out. There is not much timber used, as the ground seemed very good. The drifts were timbered with stulls, but as the chute of ore got larger sets were put in.

They had no outlet but the tunnel, but were running a drift to connect with an incline from the old workings. They had eighty feet further to go. This would give them another outlet to surface. The air was fairly good, considering they had no return. There were several crevices, either to the old workings or to surface, that helped ventilation. They work twenty-seven men, and the ore is treated at their mill in Philipsburg.

H. D. Rehfeld had charge of this mine.

The Combination mine, at Black Pine, is worked by the Combination Mining & Milling Company. The Harper, or old shaft, has been abandoned for hoisting purposes; the two shafts have been connected, and the mine is being worked at present through the Harrison shaft. This shaft is down two hundred and sixty-five feet. The ledge is worked about one hundred feet below this, and the ore is brought up an incline that pitches at an angle of twenty degrees. The air is pretty good, and the mine is timbered with stulls and kept well filled with waste. During the past year they have erected a large shaft house, and have put on larger hoisting machinery and a cage in the shaft. They employ one hundred and sixty men in and around the mine. A twenty-stamp mill is kept going constantly on the ore taken from the mine. F. W. Sherman is Superintendent.

CHAMPION.

The Champion mine has been worked by the Champion Mining and Milling Company for the past five years. A two-compartment shaft is down eight hundred feet, timbered from the surface to the five hundred with eight by eight inch timbers. From the five hundred to the eight hundred ten by ten inch timbers are used. Levels are driven and considerable stoping done.

The levels are timbered with sets, the stopes with stulls and filled with waste. The stulls are long and not of much service, the principal support to the walls being the waste, which is good when the stopes are kept well filled. A Knowles pump is used to keep out the water. Cage, $1\frac{1}{4}$ inch rope and 12x14 double-cylinder engine for hoisting. They employ forty-five men. The ore is treated at their mill in Deer Lodge. E. T. Stoughton is Superintendent.

ELLISTON.

About thirteen miles southeast of Elliston considerable mining has been done. A number of properties that have been worked are closed down for the present.

Among those that were working when I visited this district were the Ontario and Monarch.

The Ontario mine is owned and worked by William Dyer. A tunnel is driven in the hill about six hundred feet, where the ledge is cut and drifted on, and it has been pretty well stoped out from here to the surface, a distance of about one hundred and fifty feet. From the drift a small two-compartment shaft is sunk to the depth of one hundred and twenty-eight feet. The ledge had been drifted upon and they were driving an uprise, but they did not have it connected with the other level. The air was pretty good, but would be better when the uprise was completed. The drifts are timbered with sets and the stopes with stulls, and kept filled with waste, making it secure. They employ twenty-five men in and around the mine, and the ore is shipped to different places for treatment. William Job is foreman.

The Monarch mine is about three miles from the Ontario, and is worked by the Grand Republic Mining Company. A two-compartment shaft is sunk to the depth of one hundred feet, and they were drifting on the ledge. At the depth of fifty feet some stoping had been done. It was fairly well timbered, and the air was not very good. The ore taken from this mine was concentrated at the company's concentrator before being shipped. A bucket, five-eighths inch rope and small engine are used for hoisting. They work twenty-five men. H. E. Emerson had charge of the mine.

The Bald Butte mine, situated about three miles from Marysville, but in Deer Lodge County, is worked by the Bald Butte Mining Company. This mine has been in operation for the past three years. An incline shaft is down two hundred and sixty feet, pitching at an angle of fifty degrees. The shaft, to a depth of thirty feet, is timbered with cribbing. Below this hardly any timbers are used. Sets are placed at great distances apart, no girths being used. Most of the timbers used in the shaft are not strong, and afford no security to the ground. Connections were made from the two hundred to the surface. The air above this was good, but at the bottom, where they were drifting on the ledge, it was not good. The stopes are timbered with stulls, and not well filled. A bucket, small engine and

seven-eighths inch rope are used for hoisting. A Blake's sinking pump is used for keeping out the water. They work twenty-five men, and have a twenty-stamp mill to treat the ore. Thomas Sincox is foreman.

FERGUS COUNTY.

Around the town of Maiden the principal mining done in this county is carried on. There have been a good many mining claims developed in this county during the past year, and the work of opening up the old mines and placing them in condition to increase their output has gone on steadily, giving employment to about one hundred miners.

A short distance from Maiden coal has been discovered, and is worked to the extent of supplying the town and the mill at the Spotted Horse mine.

MAIDEN.

The Spotted Horse mine is owned by P. W. McAdow and has been worked for the past five years, the first work of development being through a tunnel run in the hill. A two-compartment shaft is down 377 feet, timbered with 8x8-inch timbers. Levels have been driven and connections made. The air was pretty good. In the stopes where timbers are used sets are put in. In some of the old workings, especially where the chute of ore was large, stulls were used instead of sets. Much of this work had to be gone over and re-timbered.

The She mine has been worked some during the year.

GALLATIN COUNTY.

The coal mines of Gallatin county have been worked steadily

for the past year, giving employment to about two hundred men. The principal coal mining is done at Timberline, and the average output of coal is about two hundred tons per day and is used principally on the Northern Pacific Railroad. Some coal was mined at Chestnut to supply a local trade.

TIMBERLINE.

Timberline mine, owned by the Northern Pacific Coal Company, is worked under lease by C. W. Hoffman.

No. 3 slope pitches about 30 degrees. The first lift is down 280 feet, but were not working on it when I visited the mine. The second lift is down 313 feet from the first, and all the work being done was on this lift. Quite a number of entries were driven, and rooms were worked from them. The slope is the down-cast, and there is an independent air course that connects with the fan, which draws out the air instead of forcing it in. The brattice and air courses are kept well up.

This mine is well timbered and well ventilated. The average height of coal is about five feet.

A one-inch rope, 12x20 double cylinder engine was in use to hoist the cars.

JEFFERSON COUNTY.

The mines of Jefferson County gave employment to about 650 men and produced a large quantity of ore, considering that several mines that had been previously worked suspended operation during the past year.

A smelting plant has been erected at Boulder. At Elkhorn the Holter mine worked continuously. The Union, Tacoma, C. & D., with others, have done some work, but were closed down the greater part of the year.

Very little mining has been done at Basin. The Hope and others employed a few men. The mines in the Cataract district

have done some assessment work. The Comet mine, at Comet, worked its regular force of men. The East Rumley worked for a time, but at present is closed down. Around Wickes several small properties have been worked, and the Alta employed a large force of men. At Placer, the H. and H. and the East Pacific did a great deal of developing work and shipped a large quantity of ore. The Lilly, at Placer, and the North Home, at Radersburg, have been worked.

ELKHORN.

The Holter mine is worked by the Elkhorn Mining Company, limited, John W. Plummer, Manager. This mine has been worked by the company for the past two years. The shaft is an incline pitching at an angle of thirty-seven degrees, and is down 1480 feet with stations cut and the ledge drifted on down to the 1450. The levels are connected by uprisers from the 1350 to surface. The hanging wall is good. The first fifty feet of the shaft is timbered with sets, it being under the foundation of the hoisting engine. In other parts of the mine stulls are used. The air was good except on the 1450, which was not yet connected. The only work being done on this level was drifting on the ledge. A double deck skip is used, having no safety appliances. The rope is $1\frac{1}{4}$ inches, the engine 20x60 double cylinder. They give employment to 150 men in and around the mine. A twenty-five stamp mill is kept going on the free milling ore. The lead ores are shipped to the smelters at East Helena. C. A. Molson, superintendent. Thomas Davey, foreman.

WICKES.

The Alta mine, worked by the Helena & Livingston Reduction Company, S. D. Davis, Superintendent. This mine is worked through tunnels. Five of them are driven in the hill. The fifth is called the 800-foot level. From the 800 an incline shaft is down 235 feet and two levels are driven. Connections have been made from the lower level to the upper tunnel, and the air in most parts of the mine was good. The tunnels and drifts are timbered with sets, and the stopes with posts and stringers, and filled with waste. In places where the stopes are wide sets are put in. A hoisting plant run by electricity has been put in which gives pretty good satisfaction. This company employs one hundred and seventy men. The ore is concentrated at Corbin and then treated at East Helena smelter.

COMET.

Comet mine, worked under lease by Murray & Co. Considerable work has been done on this property at different times. The shaft is down 500 feet. Give employment to twenty-three men and have their ore treated at East Helena.

East Rumley mine was located in 1870. The shaft is down 300 feet. They have made connections with surface, which gives them an outlet besides the main shaft, and makes the ventilation much better. They also improved their system of timbering and provided their men with ladders in the man way. They work about thirty-five men.

PLACER.

The H and H mine is worked by the Custer Mining Syndicate. O. A. Tibbetts is superintendent. Work has been prosecuted on this property for the past five years. A tunnel is run in the hill above where the shaft is sunk. The shaft is a two compartment, down 280 feet; timbered with eight by eight inch timbers; with levels driven and connections made from the 270 to surface. Considerable drifting and stoping has been done on this property during the past year. The levels are timbered with sets, the stopes with sets and one-half sets, as the occasion requires, and then well filled with waste. Two sinking pumps keep the water out. A cage, seven-eighths inch rope and twelve by sixteen double cylinder engine for hoisting. Employ sixty men, and the ore is shipped to Tacoma for treatment. E. O. Cole is foreman.

East Pacific Mine is worked by the East Pacific Mining Company. W. S. Dodge is superintendent. Three tunnels are driven in the hill. Two hundred feet below No. 1 is No. 2. Two hundred and seventy feet farther down is the lower tunnel, or No. 3. An intermediate level is driven between the first two tunnels and connections made from the lower to the upper workings, and the ventilation was pretty good.

Levels are timbered with sets. The timbers used are not heavy. The stopes are kept pretty well filled with waste and the only timbers used in them were sprags. This company employ eighty men, and the ore taken from the mine is treated at Aurora, Illinois.

The North Home Mine, out from Radersburg, has been worked during the past year and gave employment to thirty men.

LEWIS AND CLARKE.

This county during the past year has fully sustained its reputation as a mining county, giving employment to about four hundred men in its mines besides those employed in the mills and East Helena smelters, which give work to a large number of men.

At Marysville the Drumlummon, and old Belmont worked a large force of men.

At Empire the Empire, and Bell Boy have been worked to their full capacity, as well as the Bald Butte, situated three miles from Marysville, in Deer Lodge county.

Up at Unionville the Mac, and McIntyre mines have been steady producers of ore.

Work has gone on steadily at Rimini, Ten Mile, and Blue Cloud with very encouraging results.

MARYSVILLE.

The Drumlummon mine is worked by the Montana Company (Limited). About nine hundred feet in the four hundred-foot level an incline shaft, pitching at seventy degrees, is sunk to the depth of sixteen hundred feet, with stations cut and drifts driven.

About seven hundred feet south of this is shaft No. 2, sunk to the depth of twelve hundred feet. These two shafts are connected by drifts on the six hundred and one thousand foot levels.

In the levels, where timbers are used, sets are put in. In the stopes, stulls are principally used; in places posts and stringers, and, when the hanging wall is bad and there is not enough waste to fill in, cribs and bulkheads are put in. During the past year there has been some work done below the four hundred foot level, but the principal work done was above this point. Last spring the timbers in the shaft took fire from some unknown cause, and although they were successful in getting out all the men without any one being injured, and were very successful in quenching the fire, it was not until a large quantity of the timbers in the shaft were destroyed. This fire necessitated the filling of the mine with water for a certain distance, and when I went through, the water had not yet been pumped out.

They were working the "Nine Hour," and have made connections with the surface. The air in this part of the mine was good, and in all places where men were at work.

This company gives employment to one hundred and seventy-five men, in and around their mines, and the ore taken from them is treated at their mills, at Marysville. G. H. Robinson is Manager, and James H. Henley, Superintendent.

The Belmont mine is operated by the Belmont Mining Company. This mine was worked about ten years ago, but closed down and remained so until the past year, when it again resumed operations.

The mine is worked through tunnels. Three of them have been driven into the hill, where the ledge was cut and drifted on, and stoping was in progress. The tunnels and drifts are timbered with sets. In the stopes stulls are mostly used. The air was good. The tunnels were connected by uprisings, and were connected with the surface, which gave them two ways of egress from the mine.

They give employment to twelve men, and the ore is treated at the old Belmont mill. V. D. Becker is Superintendent, and Samuel Argall, foreman.

EMPIRE.

The Empire mine is situated about three miles from Marysville, at Empire, and is operated by the Golden Leaf Mining Company. Work was resumed on this property about two years ago, and it has been worked continuously ever since. The principal work is done through a tunnel called the five hundred foot level. About one hundred and eighty feet above this is the next level. There are two others, about sixty and eighty feet apart, which connect with the surface. The air was fairly good in all places where men were at work. The walls are good and not many timbers are used. Stulls are put in where timbers are used. They work fifty men, and the ore is treated at the company's mill, about one-half mile from the mine. J. H. Longmaid is Superintendent, and Henry Northey, Foreman.

The Bell Boy has been worked by the same company since last April. An incline shaft is sunk on the chute of ore to the depth of one hundred and seventy feet, and the ore was being stoped out on each side of the shaft, from surface down. The mine is timbered with posts and stringers, and in places stulls are used. The timbers used are not strong, and the places where the ore had been stoped

out were very close to the shaft, and not filled. The air was fairly good. They work fifteen men, and the ore is treated at their mill at Empire. Thomas Martin is Foreman.

UNIONVILLE.

The Mac mine is worked by the Mac Mining Company. Three tunnels are run in the hill, where the ledge is cut and drifted upon. The upper tunnel is abandoned, and the principal work is being done through the lower one, or No. 3. Stoping is in progress above No. 2, and between No. 2 and No. 3. Connections have been made through from the lower tunnel to the surface, giving two outlets and making the air very good. The tunnels are timbered with sets, the drifts with posts and stringers, and the stopes with stulls. They work ten men, and the ore is treated at Unionville, in the company's mill, which has a capacity of twenty tons per day. J. C. McCann has charge of the mine.

The McIntyre mine is worked by the Whitlatch Union and McIntyre Mining and Milling Company. An incline shaft is down about three hundred and thirty feet. The upper part is timbered with sets, but lower down stulls are put in. At the one hundred and fifty foot level the ledge is drifted upon. The only work being done at the three hundred was stoping out some ground. These stopes were timbered with stulls. The hanging wall seemed pretty good. They have no connection to the surface but the shaft, and the air was not extra good. This company gives employment to twenty men, and the ore is treated at the company's mill, at Unionville, which has a capacity of twenty tons per day. Michael Cooney is Superintendent.

MEAGHER COUNTY.

The principal drawback to the mines of this county has been the lack of reduction plants, and the great expense necessitated by shipping the ore to the different smelters. After the expense of transportation and smelting, with the present low price of silver, the ore must be of the highest grade to pay the owners anything. While the inferior grade ores if treated at home would pay shipping, it is

not to be thought of for the present. The quartz mines of Meagher gave employment to about 400 men during the past year.

NEIHART.

The mines of Neihart, and in the immediate vicinity, Snow Creek and Carpenter gulch, employ about 250 men.

The principal mines on which work has been prosecuted, are: Moulton, Queen of the Hill, Florence, The Monarch, Ingersoll, Dakota, Gault, the Benton group, the Cornucopia group, the Whippoorwill, the I. X. L., and several smaller claims.

Moulton mine, owned by the Diamond R. Mining Company, R. M. Raymond, Superintendent, W. H. Banks, Foreman. This property has been worked for the past three years. A three compartment shaft is sunk to the depth of 307 feet, timbered with 10x10 inch timbers, with station cut at the 300-foot level. The ledge is cross-cutted and drifted on and considerable stoping done. Connections have been made to surface making ventilation good. The drifts are well timbered with sets made of large round timbers. The stopes are well timbered with stulls and well filled with waste. A station pump on the 300-foot level keeps the water out. Cages, $3\frac{1}{2} \times 1\frac{1}{2}$ inch cables, 16x42 cylinder engine for hoisting. A large shaft house has been erected during the past year. Employ sixty men. The ore is shipped to different places for treatment. Everything in and around this mine is in good condition.

Queen of the Hill mine, owned by the Queen of the Hill Mining Company. The first work of developing this property commenced about nine years ago. The present company have been working it since October, 1890. There is a drift driven on the ledge about 1,000 feet. One hundred feet above this there is another drift, and connections have been made from the lower to the entrance of the upper drift. An uprise 500 feet in the lower drift is connected with the upper drift, which gives a return to the air, making ventilation pretty good. It is well timbered, the drifts with sets and the stopes with sets and stulls, and is fairly well filled with waste. A three-compartment shaft is down 117 feet, timbered with 10x10-inch timbers, with a station cut at the 100-foot level, and were cross-cutting for the ledge.

During the past year this company has erected a large shaft-house and a large power-house about 100 yards from the hoist. This power-house furnishes power to run the hoisting engine, also the

town of Neihart with electric lights. They work 35 men, and have the ore treated at Great Falls. C. L. Parker, superintendent; Rene Curin, foreman.

Florence mine, Florence and M. and I. mining claims. Owned by the Florence Mining Company. This mine has been worked steadily for the past three years. There was some work done before the present company took possession of this property. The drift is in 420 feet. About 145 feet in this drift a shaft is sunk 100 feet. The ledge was drifted on at the 50-foot and 100-foot levels, and some stoping done. They were driving up-rises to make connections from the bottom to the main tunnel. Above the main tunnel some stoping had been done, and an up-rise of fifty feet connected to surface by drift. Where the ledge is stoped out not much timbers are used, as it is filled with waste. The drifts are timbered with sets, also the up-rises. The mine is very well secured. When connections are made the ventilation will be excellent. A Knowles pump was used to keep the water out, and a small engine, three-quarter-inch rope and bucket for hoisting.

The ore is treated at different places. Eighteen men are employed. G. L. Johnston, superintendent, and W. H. Brown, foreman.

The Monarch mine, owned by the Monarch Mining Company, has been worked for the past three years. A drift was driven about 1,500 feet in on the ledge. About 250 feet in this drift a two-compartment shaft was sunk. Connections have been made to the surface with the up-rise that was started over the shaft. This mine was not working when I visited the mines of this locality. They had closed down to get machinery on it to cope with the water. This company give employment to 10 men, and the ore is treated at the Great Falls smelter. W. J. Clark, manager.

Ingersoll mine, owned by the Ingersoll Mining Company. The work of developing this mine commenced four years ago. The present company have been working it for the past three years. During the past year considerable drifting has been done. When I visited this mine they were driving the main drift and working a stope. The drift is a long distance in the hill, and to drive an up-rise to the surface they would have to run 700 feet. It was ventilated by pipes being laid in to where the men were at work, and a small steam jet was turned into the pipe on the outside. This expanded the air and drew out enough to make a circulation, giving a fair supply of air to the men.

The walls are fairly good. Not much timber is used. In places the drifts are timbered with sets and the stopes with stulls. Nine men are employed.

Dakota mine, owned by the Neihart Mining Company. This property has been worked for several years, the principal work being tunneling and driving drifts. The rock is very hard and little timbering is necessary. While there has been some work done on this mine during the past year, they were working but few men when I visited it. A. Lambert is superintendent.

Gault Mine is worked by the Gault Mining Company. This mine has been worked at intervals since 1884. A shaft was sunk to the depth of 160 feet and some drifting and stoping done. Lower down on the hill a tunnel had been driven in about 350 feet. From this tunnel they started an uprise, this being all the work they were doing. The air was not very good but would be much better when the uprise was completed.

In the tunnel where timbers were used, sets were put in. The uprise was fairly well timbered with sets. They worked eight men, and had their ore shipped to different places for treatment. John McCassy is superintendent and Fred. Link is foreman.

SNOW CREEK.

On the other side of the range at the head of Snow Creek is situated the Benton Group and the Cornucopia Mines.

The Benton Group of Mines is owned by the Montana Mining Company. The work of developing these mines has been in progress for the past two years. They were driving a tunnel which was in about eight hundred feet, cross-cutting the formation. They have drifted some distance north and south on the ledge. The tunnel is connected by an uprise to the surface. No. 2 tunnel, driven in below, is connected with No. 1. About 250 feet below No. 2 tunnel is No. 3, which is to be the main tunnel for the mine. In No. 2 the ledge has been drifted on and some stoping done. Ventilation is good and the mine securely timbered.

There has been considerable work done in this mine during the past year. They work thirty-five men, and ore is treated at the Helena Sampling Works.

D. L. S. Barker is superintendent and W. H. Chisholm is foreman.

Cornucopia Group is owned by the Cornucopia Mining Company. This company has been developing this property since March, 1891. They have tunneled into the hill at three different points and cut the ledges and drifted on them. A two compartment shaft is down three hundred feet with stations at the one hundred and fifty and three hundred foot levels; cross-cutted and drifted, and some stoping done. They were drifting on the one hundred and fifty foot level when I visited the mine. The air was fairly good and the mine is well timbered with sets and lagged, when occasion requires it. They have good machinery and furnish their employes with everything to secure themselves. They give employment to thirty men. P. H. Donovan is superintendent and M. J. Boyle is foreman.

The I. X. L. Company worked a few men on their group of mines during the past year.

CARPENTER CREEK.

Whip-poor-will mine is situated on Carpenter Creek and is worked by the Whip-poor-will Mining Company. Some work had been done on this mine, during the past eight years, which consisted of tunneling, drifting and sinking the shaft to the depth of one hundred feet.

The present company commenced work last March, and sunk the shaft to the depth of 250 feet, and cross-cutted north and south. In the first one hundred feet of the shaft the timbers used were not strong. Below this it was timbered with eight by eight inch timbers. The air where the men were at work was fairly good. A No. 6 Knowles sinker was in use to keep out the water. A bucket three-fourths inch rope and small engine for hoisting. They work sixteen men in and around the mine. Col. A. Lambert is manager and Richard E. McCarthy is superintendent.

BARKER AND HUGHESVILLE.

Since my last report the railroad has been extended from Monarch to Barker, thereby giving the people of Barker, and Hughesville, a small mining camp about two miles from Barker, better facilities for shipping the ore taken from their mines. Most of the ore is smelted

at Great Falls. During the past year a great deal of work has been done by men interested in the mines of this locality in the way of developing old properties and opening up new ones.

When I visited these two camps they were working about 100 men in and around the mines, and expected to give employment to many more in the near future.

HUGHESVILLE.

The Carter mine, at Hughesville, is worked by the Carter Mining Company. A two compartment shaft was sunk to the depth of 90 feet. Were going to cross-cut the ledge at the 100-foot level. They were putting up a hoist and were preparing to put in hoisting machinery. Employ 8 men around the mine. J. Barker, Superintendent, and David O'Neill, Foreman.

May and Edna Mine, worked by the May and Edna Mining Company. The first work was done on this property about three years ago. The lower tunnel is driven in about 700 feet, and is timbered with sets. About 195 feet in this tunnel an uprise was driven to surface, and the face of the workings was ventilated by means of a box connected with this uprise, which gives a return to the air. Above this tunnel, on the hill, two more tunnels were driven a short distance and connected by a winze. The only work being done was sinking a winze that was not very well timbered. I called the foreman's attention to it and notified him to make some repairs. There has been some stoping done in this part of the mine. Give employment to twelve men in and around the mine. The ore is treated at Great Falls.

Top Hand mine, worked by the Paragon Mining Company. There was some work done on this mine in 1889. Has been worked constantly since September, 1890. This mine is worked through a tunnel which was driven in about 400 feet, and timbered with sets and lagged where required. The vein does not pitch a great deal, and there was some stoping done on both sides of the tunnel, and the ground timbered with stulls. This mine is well secured and very well ventilated. The ore is treated at Great Falls, East Helena, and some shipped to Kansas City and Omaha. J. K. Castner is Superintendent, and John Lee, Foreman.

Barker mine, worked by the Barker Mining Company. This mine has been worked at different times for the past three years.

The shaft is down 180 feet, timbered with 8x8 inch timbers. At the 80-foot level the ledge was cut and connections made with a tunnel that runs to surface. From this tunnel some ground has been stoped out, but the old workings have been abandoned for the present. The drifts are mostly timbered with sets. In places caps, posts, and stulls are used. A Blake sinking pump is used to keep the water out. A bucket, three-quarter-inch rope, and small engine for hoisting. There was no gallows frame put up to support the sheave wheel. It was supported by stringers extending across the hoist which were very low and close to the collar of the shaft. I called the Superintendent's attention to it, and asked him to make some changes by raising it and making it more substantial. Give employment to 12 men. The ore is treated at Great Falls. William C. Stanley had charge of this mine.

The Block P Mine was worked several years ago. A tunnel was run in the hill, and the ledge cut and drifted on and some stoping done. Since December, 1890, a two compartment shaft was sunk to the depth of 70 feet, timbered with 10x10 inch timbers. They intended to sink to the depth of 190 feet. At the 80 foot they expected to make connections with the old workings. This mine is securely timbered sets and stulls being used. The air was fairly good. A bucket and 9x12 cylinder engine were used for hoisting. Besides the men employed sinking, a few were working in the stopes giving work to about twenty-five men. The ore is treated at Great Falls. Albert Cowin had charge of the mine.

The Eclipse mine, worked by the Eclipse Mining Company, under lease and bond. A tunnel was driven and the ledge cut and some stoping done. Work five men. W. B. Bagby had charge.

BARKER.

Silver Bell mine, worked under bond by J. T. Armington, E. D. Barker & Co. This property has been worked at intervals for the past ten years. The work at present was sinking a two compartment shaft to the depth of 100 feet. Were down 60 feet when I visited the mine. A sinking pump is in use to keep the water out. A small engine, ½ inch rope and bucket for hoisting. Employ 11 men. J. L. O'Neill, Foreman.

CASTLE.

Life in mining circles around Castle and vicinity has been very

quiet during the latter part of the year. The Yellowstone, Armeda, Iron Chief and other properties have been closed down. The Cumberland has not been working its full force of men.

The Cumberland Smelter was not in operation when I visited Castle, but was to start up very soon.

Jumbo Mine has been worked at different times during the past few years. At present it is being worked under bond.

A two compartment shaft is down two hundred feet, with levels driven at the one hundred and two hundred foot. The air on the one hundred was fairly good, as connections had been made to surface. The two hundred was not connected with the one hundred.

Few timbers are used and the ground seemed pretty good. A bucket and small engine is used for hoisting. They work twelve men. Ambrose Stewart had charge.

Cumberland Mine is owned by the Cumberland Mining Company. A three compartment shaft is sunk to the depth of five hundred feet, timbered with twelve by twelve inch timbers, with a station cut at the three hundred. Drifts are driven and cross-cutted, and considerable stoping done.

Connections have been made to the old shaft, which was sunk to the depth of five hundred feet, farther up on the hill. This mine is very well timbered, but not well filled. The chute of ore is several sets wide. A winze has been sunk 250 feet below the three hundred foot level with drifts driven and some stoping done, and the north drift on the three hundred has been driven some distance. The only work being done when I visited this mine was stoping above the three hundred. Below this the shaft was filled with water. A Knowles pump on the three hundred foot level kept the water out above this point. A four and one-half by one-half inch cable and sixteen by forty-eight inch double cylinder engine for hoisting. This mine gives employment to forty-five men, and the ore is treated at their smelters. The old Yellowstone smelter has been moved up to the Cumberland smelter. A. J. Huneke is superintendent and Peter Mac is foreman.

MADISON.

The placer diggings of this county are yet worked, and some are still very profitable.

Quartz mining is still in its infancy. Around Virginia City several quartz claims have been working a few men; a mill having been erected during the past summer by Patrick Largy, of Butte.

At Sheridan the Noble, the McCranor, and the Toledo are being developed. The Toledo is sunk to the depth of three hundred feet.

At Silver Star a number of prospects are being worked.

MISSOULA COUNTY.

The principal mines of this county that have been in operation during the past year are: The Iron Mountain, at Pardee; the Little Anaconda, on Deep Creek; the Keystone, Little Pittsburg and Eldorado, on Spring Gulch, out from the town of Carter.

At Nine Mile, the Nine Mile and others are being developed.

The Curlew, near Victor, in the Bitter Root valley, is working a full force of men.

A large quantity of ore has been taken from these mines and a good deal of developing and prospecting done, giving employment to about 250 men and promising a bright future to the miners of Missoula county.

The Curlew mine is situated near Victor, and is worked by the Helena & Victor Mining Company. Work has been prosecuted on this property for the past five years. The shaft is down 500 feet, with levels driven and worked to the 400. Below this no work has been done but sinking the shaft. Connections have been made from the 400 to the surface by up-rises, and the air was good where men were at work. The ground is heavy and of a swelling character, and unless the stopes are bulkheaded or filled with waste it is hard to hold the ground. While there is not much danger that it would cave suddenly, unless well secured, it would only be a question of time when the stopes and drifts would close, regardless of the strength of the timbers.

They neglected to fill some stopes after taking out the ore, and they caved. The up-rises were also neglected, and instead of easing the timbers, as should be done in such cases, they kept blocking

timbers against it until a person could hardly pass through. Last summer Joseph McDonald took charge as superintendent, and was repairing the mine as fast as possible. He was timbering with sets of strong, round timber and keeping the stopes well filled with waste as they were worked out, and making several other necessary improvements.

A Dean sinking pump is used to keep the water out, a cage, one-inch rope and a 14x18 double cylinder engine for hoisting. Employ 60 men. A concentrator with a capacity of 125 tons per day is kept going steadily at the mine. The ore is then sent to East Helena for treatment. T. D. Yates, foreman.

PARDEE.

Iron Mountain mine. This property has been worked by the Iron Mountain Mining Company for the past four years. Four tunnels have been run in the hill. All the work at present is being done through the lower tunnel. From this tunnel a shaft is sunk to the depth of 200 feet, with two levels driven, and were at work stoping. Connections had been made between the different workings and surface. The air was fairly good. Where timbers were used in the tunnels and drifts sets were put in. The stopes are mostly timbered with stulls. The waste in the old stopes has been run out and taken to the concentrator, as there was some ore through it and would pay to handle. The ground seemed good and, as yet, not heavy.

This company has built a concentrator about one mile below the mine, with a capacity of 50 tons per day. The ore is concentrated here and then shipped to the East Helena smelter. Employ 55 men at the mine. W. W. Adams, superintendent, and J. D. Fletcher, foreman.

The Little Anaconda mine is situated between Deep Creek and Spring Gulch. It is worked under lease by some parties.

A tunnel is run in the hill, where the chute of ore is cut and drifted on. An up-rise is driven to the surface, and the air was fairly good. The drifts are timbered with sets, and stulls are used in the stopes. Employ 18 men.

NINE MILE.

The Nine Mile mine is being developed by the Nine Mile Mining Company, giving employment to 20 men.

SPRING GULCH.

Keystone mine has been worked by the K. and K. Mining Company since June, 1891, with John Cromie as superintendent. A tunnel driven in the hill taps a chute of ore, where the ledge is cut and drifted on. They were sinking a winze on the ore chute and working several stopes. The tunnel is connected with the surface by an uprise, and the air was good. Stulls are used in the stopes, and caps and posts in the drifts. Work twenty-eight men and have their ore treated at East Helena.

PARK COUNTY.

Park County produces more coal than any other county in the State. The coal mines have been worked steadily, they having a good market for their coal and coke, and about 785 men have been employed in the coal mines. At Red Lodge is one of the largest coal mines of the State. The workings in this mine are quite extensive. At Cokedale and Horr there is considerable coal mined and made into coke, besides they ship some lump coal.

Quartz mining has been carried on in this county. Out from Cinnabar some claims have been worked. At Cooke City and at Boulder, a new mining camp about sixty miles from Livingston, a number of men have been employed on the different mining claims. About 100 men are employed in the quartz mines of Park County.

RED LODGE.

Rocky Fork Coal Company's mines, J. M. Fox, manager. No. 2 mine is worked through a tunnel. No. 4 mine is a slope sunk on the vein pitching about twenty degrees. The workings are very extensive, a large number of entries driven and rooms worked from them. The vein varies in thickness. In places it is twelve feet or more, averaging about six feet of merchantable coal. When working to their full capacity they mine 1,200 to 1,400 tons per day, but they do not work steadily. Their daily output is about 800 tons per day. These mines are worked on the double entry system, and

each mine is ventilated by a fan. The air is good, the brattice and air ways being kept so the current is carried around through the face of the workings. The vein pitches twenty degrees and owing to the vast amount of powder used in breaking the coal it requires a large amount of air to make ventilation good. In No. 4 mine the slope is timbered with long stringers and posts. In these mines, in parts of the entries, posts and caps are put in. Props or stulls are used in the rooms. A gravity haulage machine lets down the loaded cars and draws the empty ones up. One and one-quarter inch rope and a 24x40 double cylinder engine are used to pull the cars out of the slope. This company employs 400 men around their mines. William Connors, superintendent.

COKEDALE.

Livingston Coal and Coke Company. No. 1 is a drift driven on the vein. A slope pitching at an angle of forty degrees is sunk to the depth of 600 feet, with two lifts driven, called No. 2 and No. 3. They are all connected, the system being to drive an air course over and with the entry. This mine is ventilated by a fan and the air in all parts of the mine is good. The slope is timbered with sets, the entries are mostly timbered with the same. Props or stulls are used to timber the rooms. The vein of coal varies from one to five feet. When free from dirt it makes a very good coking coal.

This company has one hundred coking ovens that are kept going making coke. Besides the coke they also ship coal. A one-inch smooth rope and a 24x40 double cylinder engine for hoisting the cars. They give employment to 200 men in the mine. George T. Wickes, superintendent.

HORR.

The Park Coal and Coke Mines. There has been considerable work done here by tunnelling in the hill. The mine worked at present is the one farthest up on the hill, and the sixth opening of this kind, which is a drift or entry run in on the vein. The vein pitches about ten degrees. The coal is of a good coking quality and the vein of coal is about five feet in thickness. There is also a slope sunk on the vein that is connected with the other working. Ventilation was good.

Props are the kind of timbers mostly in use. At places in the

entry, where required, posts and caps were put in. Forty coke ovens are kept going constantly, and they also ship some lump coal. They employ 185 men in the mine. S. C. Hunter is manager and David Bevan is superintendent.

SILVER BOW COUNTY.

This is the smallest county in area in the State, also the wealthiest and most densely populated. People from all parts of the civilized world have come here to make their homes.

Mining is the chief industry, and Silver Bow county is the greatest mining center and mineral producer of the world. While this county is a large producer of silver it is second to none as a copper producer. Nature has so endowed this locality that within the radius of one mile can be found more mineral than in any other part of the world.

The mines of this county are worked on a very extensive scale, and nowhere can be found better worked mines, and the very finest machinery is in use. Everything is done to insure the safety of the employes.

A vast amount of money has been expended during the past year in prospecting and developing new properties, and several important sales have taken place. About 4,500 men have been employed in and around the mines.

Anaconda Mining Company's Mines. The following properties have been worked continuously by this company during the past year, with Marcus Daly as general manager: Anaconda, St. Lawrence, High Ore, Bell, Mountain Consolidated, Green Mountain, and Wake Up Jim. The Modoc mine was worked during the early part of the year, but closed down last spring and no work has been done on it since. All these mines are large and the workings very extensive. The ledges are very wide and tremendous quantities of ore is taken out daily, necessitating the use of a large quantity of timbers. The ore taken from these properties is shipped to the Anaconda smelters, at Anaconda.

This company employs 1,750 men in and around their mines.

The St. Lawrence and Anaconda mines: The St. Lawrence

shaft is a three-compartment, sunk to the depth of one thousand feet, with stations cut and levels driven, and stoping was going on below the six hundred foot level.

The main shaft of the Anaconda is a three-compartment, and is down one thousand one hundred feet, with stations and levels to the one thousand foot level. They were sinking a two-compartment shaft on the Anaconda, west of the main shaft. It was down five hundred feet, and they were going to continue sinking until they reached a depth of one thousand feet. This will give them two hoisting shafts on the Anaconda.

Connections have been made with the surface in both mines, and, besides they are connected with each other on some levels. The levels are timbered with sets, and the stopes with the same and doubled, and the stopes are kept well filled with waste. The ledge being large, it requires a vast amount of waste to fill the stopes. The ventilation is pretty good, with the exception of a few places, where it was quite warm. A large station pump, on the thousand foot level of the Anaconda, kept the water out. Double-deck cages and 20x60 inch double-cylinder engines are in use at these mines. John O'Neill is Foreman of the Anaconda, and John Kane fills a like position at the St. Lawrence. Patrick Kane is Superintendent.

The Bell and High Ore mines: On the High Ore a three-compartment shaft is sunk to the depth of seven hundred feet, with stations cut and levels driven. The Bell mine is worked through this shaft. The levels are timbered with sets, the stopes with sets, half sets and stulls, as occasion requires, and then kept well filled with waste. These mines are securely timbered and filled in. The ventilation in all parts of them is good, connections having been made to surface. A large Knowles pump keeps out the water. Cages, four by one-half inch cable and an 18x36 inch double-cylinder engine are used for hoisting. Patrick O'Neill is Foreman, and M. J. O'Farrell, Superintendent.

On the Mountain Consolidated mine a three-compartment shaft is sunk to the depth of seven hundred and sixty feet, with stations cut and levels driven, and the work of stoping out the ore was in progress. The levels are timbered with sets, the stopes with the same and doubled in places, and kept well filled with waste as the ore is taken out. Connections have been made to surface, which makes the ventilation pretty good. Southwest of this shaft a large shaft house has been built, and they are sinking a two-compartment

shaft, called No. 2. In No. 1 shaft a large Knowles station pump was in use to keep the water out, double-deck cages, six by one-half inch cable and a 20x60 double cylinder engine are used for hoisting. L. Manning is Superintendent, and James Keegan, Foreman.

Green Mountain mine. A three-compartment shaft is sunk to the depth of 700 feet, and were to continue sinking it, with stations cut and levels driven down to and on the 600-foot level, and connections have been made to the surface. The drifts are timbered with sets and the stopes with sets and doubled, and kept pretty well filled with waste. The ventilation was fairly good. Double-deck cage, 5x½ inch cable and 18x48 double cylinder engine for hoisting. John J. O'Mara, foreman.

Wake Up Jim mine. A three-compartment shaft is sunk to the depth of 680 feet, with stations cut and levels driven. The same system of timbering and filling in as used in the Green Mountain. The work of stoping out ore was going on on the 500 and 600 foot level. The ventilation was fairly good. The 500 and 600 foot levels are connected with the workings of the Green Mountain, and the Green Mountain is connected with the Mountain Consolidate, so men at work in any of them can get to any of the three hoisting shafts. During the past year they have erected a large shaft house and put in new hoisting machinery with all modern improvements, double deck cages and 18x48 double cylinder engine. The double deck cage is the same as those in use in all the mines worked by this company. Joseph Laird is Superintendent of the Green Mountain and Wake Up Jim. William Dolan is foreman of the Wake Up Jim.

Boston and Montana Company's Mines. These properties are owned and worked by the Boston and Montana Consolidated Copper and Silver Mining Company. The Mountain View, the Harris and Lloyd Tunnel, Moose, East Colusa, West Colusa, Leonard Shaft, and Liquidator. Thomas Couch is manager.

The Mountain View has been in operation for the past five years. The shaft, a three compartment, is sunk to the depth of one thousand feet, timbered with ten by ten inch timbers, with stations cut and the ledges cross-cutted and drifted on.

Connections have been made on the north ledge from the one thousand foot level to surface, and on the south ledge from the nine hundred to the surface, making the ventilation good. The levels are timbered with sets and the stopes with the same; and, as

the ledges are several sets wide, as the the ore is taken out the stopes are kept well filled with waste, making the mine very secure. Pumps on the one thousand, eight hundred, and four hundred foot levels cope with the water. Cages, four and one-half by one-half inch cable and eighteen by forty-eight inch double cylinder engine for hoisting.

The Harris and Lloyd tunnel. The shaft, a three compartment, is down 530 feet, timbered with twelve by twelve inch timbers, with stations cut down to what is called the five hundred foot level, and were cutting a station on the six hundred, the stations being numbered from the old shaft, which was farther up on the hill. The same system of timbering as in the Mountain View is used in levels and stopes. The mine is well secured and the ventilation is good. Connections have been made from the five hundred to surface. A sinking and station pump for handling the water, a nineteen by forty-eight inch double cylinder engine, and four and one-half by one-half inch cable for hoisting.

The Moose, a three compartment shaft, is down three hundred feet, with statations one hundred feet apart. Cross-cuts and drifts are timbered with sets and the stopes with half-sets and stulls and then filled with waste. The ventilation was good. Richard Dawe is foreman of the above mentioned mines.

The Leonard Shaft, the East Colusa, West Colusa, and Liquidator. Josiah Gilbert is foreman. The Leonard shaft is a three compartment, nineteen by four and one-half feet, timbered with twelve by twelve inch timbers, and is sunk to the depth of six hundred feet. Levels are driven at the five hundred and six hundred foot and connected with the workings of the other mines.

On the six hundred they were cutting a station for a large pump—the intention being to drain the water from the East Colusa, West Colusa, and Liquidator and pump it through this shaft. These mines are also worked through this shaft. The old East Colusa shaft was used for pumping purposes only. It is down eight hundred feet, but was filled with water to the five hundred foot level. A large Knowles pump on the five hundred is used to cope with the water until the pumps are put in the Leonard shaft. The West Colusa shaft is down five hundred feet and is still used for hoisting purposes. The levels in these mines are timbered with sets, also the stopes, and as the ore is stoped out they are kept filled with waste. The ground is heavy, but these mines are well secured. The air is good. On the Leonard shaft, cages, four and one-half by one-half inch cable and

nineteen by forty-eight inch cylinder engine, with all modern improvements, are used for hoisting. They have erected a large shaft house also.

The Boston and Montana Company employ five hundred and fifty men in and around their mines. The ore taken from the different properties is treated at their plant in Meaderville and at Great Falls, where they have erected a large smelting plant.

Butte and Boston Mining Company. During the past year have worked steadily the following properties: Silver Bow mine No. 1 and No. 2, the East Grey Rock and the Orphan Girl, besides having done a great deal of work on different mines and mining claims which they were developing under lease and bond. They have given employment to about 300 men in and around their mines and the ore taken from the different properties is treated at their smelter and mill, which are situated between Butte and Meaderville. C. S. Palmer, manager.

Orphan Girl mine. This mine has been worked by leasers at different times. The present work is being done under lease by the Butte and Boston Mining Company, and has been worked steadily since February. An incline shaft is sunk on the ledge to the depth of 400 feet and the ledge has been drifted on at the 100, 200, 300 and some on the 400 foot. The only work being done when I went through the mine was on the 200 and 300. The mine is timbered principally with stulls. In places in the drifts sets are put in, but not much timber is used. The air where men were at work was fairly good. L. G. Merrill, foreman.

East Grey Rock mine, owned and operated by the Butte and Boston Company. A three-compartment shaft is down 900 feet and were to continue sinking until they reached a depth of 1,000 feet. Stations are cut and levels driven down to and on the 900 foot level. The 900 was not connected with the 800, but the 800 was connected with the surface. Crosscuts and drifts are timbered with sets, the stopes with stulls and then filled with waste. There are two ledges. The principal work is being done on the south ledge. The air was fairly good.

During the past year they have put up a large shaft house and put in new hoisting machinery, a double deck cage, $4\frac{1}{2} \times 3\frac{3}{8}$ inch cable and 20x48 double cylinder engine, with all modern improvements for hoisting. David Polkinhorn, foreman.

The West Grey Rock and Belle of Butte have been worked under lease by some parties during the past year.

Silver Bow mines No. 1 and No. 2 are owned and worked by the same company. On No. 1 a three-compartment shaft is sunk to the depth of 900 feet, with stations cut and levels driven down to and on the 800-foot level and connections made to the surface through No. 2, which is down 700 feet. The ventilation in all parts of these mines was good. The cross-cuts are timbered with sets, the stopes with the same and kept well filled with waste, making the mine well secured.

A Knowles station-pump keeps the water out; $4\frac{1}{2} \times \frac{1}{2}$ -inch cable and 14x42 double cylinder engine for hoisting. Joseph Henworth is foreman and James Hoatson superintendent of this company's properties.

The Parrot, worked by the Parrot Company, with B. W. Tibbey superintendent. Work has been prosecuted on this property for the past 12 years. A three-compartment shaft is sunk to the depth of 930 feet, with levels driven down to and on the 600-foot level. They were cutting a station on the 700 when I went through the mine. Connections had been made from the 600 to the surface, and the ventilation is very good. The levels and stopes are timbered with sets, and as the ore is stoped out the stopes are kept well filled with waste. The ledges are very wide and the ground heavy, necessitating the filling in with large quantities of waste to secure it. A large 20x60 cylinder engine, with all modern improvements, is used on this property for hoisting. Matt Hodge is foreman.

Moscow mine, owned and worked by the same company. There has been considerable work done on this property during the past year. The shaft is sunk to the depth of 250 feet, with levels driven and connections made to the surface, and a good deal of stoping done. The drifts and stopes are timbered with sets, and the mine is well secured and ventilated. William Beaven, foreman.

Mina mine has been purchased by the Parrot company since my last report.

A two compartment shaft is down 120 feet, where the ledge was being drifted on. Between the hoisting compartment and the manway the shaft is lined with boards. On top, over the manway, is built a small cupalo, higher than the collar of the shaft. The manway compartment being higher becomes the upcast for the mine. East of the main shaft another shaft is sunk a short distance and

connected by drift with the main shaft which becomes the down cast for the mine. They had boards cut to fit the shaft. In case the shaft house took fire the shaft could be covered, and the men at work in the mine would be supplied with air, and could escape through the manway and cross the shaft and come to surface. This is an excellent idea as it afforded the men a separate way to escape from the mine, and made ventilation much better, until such time as connections would be made by uprisers. This mine is well timbered. The Parrot company employ 200 men under ground, and the ore taken from these properties is treated at the Parrot smelter.

The Virginus is worked under lease by David Bricker. A two compartment shaft is down 300 feet, timbered with 10x10 inch timbers, with a station at the 200 and another at the bottom. The crosscuts and drifts are timbered with sets, the stopes with the same, and kept pretty well filled with waste. The ground is heavy. They were opening up some old workings that had caved, and retimbering and filling them. Connections had been made from the bottom to surface, and the air was very good. Gave employment to sixty men in and around the mine, and the ore is treated at the Parrot smelter. Jacob Swenk, Foreman.

The following mines have been worked continuously during the past year. W. A. Clark is principal owner of them. J. K. Clark is Superintendent of the Moulton, and R. G. Brown is Superintendent of the Black Rock, Original, Colusa, Parrot, Trevonia and Acquisition mines:

The Moulton mine is owned and operated by the Moulton Mining and Milling Company. This mine has been worked for the past thirteen years, and still continues to be a large producer. A three-compartment shaft is down eight hundred and fifty feet, with stations cut every one hundred feet, and connections made from the seven hundred to surface. The ledges have been crosscut and drifted upon, and are being stoped out. Sets are used in the crosscuts and drifts, and in the stopes stulls are used and kept filled with waste. The principal work being done was in the seven hundred, three hundred and two hundred foot levels, and the air on those levels was good. A Cornish pump is used to keep the water out. They employ forty men in and around the mine, and the ore is treated at the Moulton mill, in Walkerville. James Dwyer has charge of the underground work.

The Black Rock mine is worked by the Black Rock Mining Company, with T. S. Kilgallon as Foreman. A two-compartment shaft

is sunk to the depth of four hundred and fifty feet. Stations are cut fifty feet apart below the two hundred, and above this point every one hundred feet. The ledge in some places is six sets wide, and as the ground is worked out, the drifts and crosscuts are timbered with sets, and the stopes with the same and then filled in with waste, affording good support to the timbers. The walls are of a swelling character, and it requires good timbering and filling in to keep them in place. Connections have been made from the four hundred and fifty to the surface, making the ventilation good. A ten by twelve inch double-cylinder engine, a cage and seven-eighths inch rope were used for hoisting. A Knowles sinking pump is used to pump the water from the bottom to the four hundred. It is taken from there to the surface by a station pump. This mine has been in operation about four years, and gives employment to thirty men. The ore is shipped to the Butte Reduction Works and the Moulton mill.

The Original mine, owned and operated by the Original Mining Company, has been worked for the past sixteen years. An incline shaft is sunk to the depth of seven hundred feet. This shaft has been retimbered during the past year and a cage put in it. Levels have been driven and connections have been made from the seven hundred to the surface. The mine is securely timbered and kept well filled with waste. The ventilation was good. New pumping machinery has been put in, and a good many improvements made. They employ thirty men, and the ore is treated at the Butte Reduction Works. Thomas Bryant is Foreman.

The Colusa Parrot, owned and worked by Clark Bros. This mine has been in operation for some time. The shaft is down 600 feet, and was retimbered during the past year. The old shaft-house was burned down last summer, but a new one has been built. The ledge in places is six posts wide. The drifts and stopes are timbered with sets of round timber, and as the ground is stoped out it is filled with waste. Stations are cut 100 feet apart, and connections have been made from the bottom to the surface. This mine is fairly well ventilated and well timbered. A cage, 1¼-inch rope and 10x12 double cylinder engine for hoisting. Employ 54 men. The ore is treated at the Butte Reduction Works. Herman Hesse, foreman.

Trevonia mine, operated by W. A. Clark. A two-compartment shaft is sunk to the depth of 200 feet, with two levels driven and connections made with the surface, and the work of stoping out the ore is in progress. The levels are timbered with sets, the stopes with one-half sets and stulls, as the occasion requires, and then filled with

waste, making the mine secure. The ventilation is good. Twenty-three men are employed in this mine, and the ore is treated at the Butte Reduction Works.

The Acquisition mine is also worked by W. A. Clark. The shaft is down 315 feet, with stations cut and levels driven down to and on the 300-foot level and connections made to the surface. About the same system of timbering and filling in as in the Trevonia. The ventilation was good. They give employment to 20 men in and around the mine, and the ore is treated at the Colorado smelter. Martin Buckley has charge of the Trevonia and Acquisition mines.

Gagnon Mine is operated by the Colorado Mining and Smelting Company. John Hewitt is foreman of this company's mines and C. W. Goodale is manager. This mine has been worked for the past sixteen years. An incline shaft, pitching at an angle of seventy-three degrees, has been sunk to the depth of one thousand feet, it being a four compartment from surface to the six hundred and from there down is a three compartment. Stations are cut one hundred feet apart. The drifts are timbered with sets and the stopes are timbered with the same excepting where the foot-wall is good and there half-sets and stulls are used. As the ground is stoped out it is well filled with waste. Connections have been made from the one thousand foot level to surface. This mine is pretty well secured and ventilated. Knowles pump is in use to keep the water out. A one inch rope, skips, and twenty-two by thirty-six inch double cylinder engine for hoisting.

The Nettie is owned and operated by the same company. This mine has been worked continuously for the past six years. The shaft, a two compartment, is down three hundred feet. Three ledges have been cut and some work done on them, the principal work being done on the south ledge. There is a winze sunk on the ledge from the three hundred foot level; was down 130 feet, with drifts driven and men at work stoping out the ore.

The mine is timbered with sets, and half-sets where the foot-wall is good. The air is pretty good excepting in a prospecting tunnel that runs northeast from the three hundred foot station, drifting and cross-cutting the formation. Connections are made from the three hundred to surface. A cage, one inch rope, and twelve by fourteen inch double cylinder engine is used for hoisting purposes.

This company have sunk a two compartment shaft in the Philadelphia mine which adjoins the Nettie. This shaft was down three

hundred feet where a station was cut and connected by drift with the winze that was sunk below the Nettie shaft. They were to continue sinking until they reached a depth of five hundred feet. This company gives employment to two hundred and twenty men in and around their mines. They have erected a new concentrator with a capacity of about 250 tons per day. The ore is treated at the Colorado Smelter.

The Star West Mine is worked under lease by the Arlington Mining Company. A two compartment shaft is sunk to the depth of three hundred feet where a station is cut, the ledge cross-cutted and drifted on and a good deal of stoping done. The cross-cuts and drifts are timbered with sets, and the stopes mostly with stulls and are kept well filled with waste, making this mine very well secured. Connections have been made to surface and the air was pretty good. They have also sunk a shaft on the west end of the mine which was down one hundred feet and the workings of this shaft are connected with the workings of the other. Employ twenty-five men, and the ore taken from this mine is treated at the Colorado Smelter. William E. Kane is foreman and C. W. Goodale is superintendent.

The following properties are owned and worked by the Alice Gold and Silver Mining Company: The Alice, Magna Charta, Blue Wing, Rising Star and others.

The Alice mine has been in operation for about eighteen years. A three compartment shaft is sunk to the depth of 1500 feet, with stations cut and levels driven, and connections made from the 1400 to surface. The levels are timbered with sets, and some of the stopes, when occasion required, with sets, half sets and stulls. As the stopes are worked out they are filled with waste, making the mine secure. The air was good where men were at work. A large Cornish pump is in use at this mine to pump the water from this and the adjoining properties belonging to this company. The water is utilized in furnishing the Alice mills.

On the Magna Charta the shaft is down 700 feet with stations cut and the ledges cross cutted and drifted. The same system of timbering as is in use at Alice. The air was good in all places that were being worked.

The Blue Wing and the Rising Star have been worked some, but suspend operation during the latter part of the year. This Company gives employment to 225 men in and around the mines, and the ore taken from these mines is treated at their mills in Walkerville. Wil-

liam E. Hall is Superintendent of these properties, and William Shovel, foreman.

The Lexington mine, owned and operated by the Lexington Mining Company. This property has been worked steadily for the past 17 years. The shaft, a three-compartment, is down 1,470 feet, with levels driven down to and on the 1,470-foot level. Connections to the surface have been made from the 1,200-foot level, south of the shaft, and from the 800-foot level, north of the shaft. The ventilation in nearly all places where men were at work was good. In the cross-cuts and drifts where timbers are put in sets are used, in the stopes sets, half sets and stulls, as occasion requires, and then well filled with waste. They use Knowles pumps to cope with the water, cages, $4\frac{1}{2} \times \frac{3}{8}$ -inch cable, and 12x16 double cylinder engine for hoisting. Give employment to 110 men in and around the mine. The ore is treated at the company's mill, near the mine. Gorman Kellogg has been foreman of this mine for several years.

Wild Bill, worked under lease by O'Shea Bros. A two-compartment shaft is down 300 feet. The principal work being done was stoping out ore on and above the 150-foot level. They employ 19 men.

Glengarry mine, operated by the Glengarry Mining Company. A two-compartment shaft is sunk to the depth of 450 feet. This mine is very well timbered, the levels with sets and the stopes with sets, half sets and stulls, when the ground requires it, and then filled with waste. Ventilation is good. Connections have been made from the 350 to the surface. A Cameron pump is in use to keep the water out; cage, one-inch rope and 8x12 double cylinder engine for hoisting. Gives employment to 25 men, and the ore is treated at the different mills in Butte. W. E. Zuicky, foreman.

Snow Drift and Silver Lick mine, worked by the Snow Drift and Silver Lick Mining Company. A two-compartment shaft is sunk to the depth of 230 feet, and timbered with 10x10-inch timbers where the ledges were crosscutted, and they were drifting on them. The cross-cuts and drifts are timbered with sets, and the ventilation was fairly good. A Knowles sinker kept the water out, and a bucket and small engine were used for hoisting. Employ 16 men. George E. Rockwood, superintendent; John Burns, foreman.

Mountain Chief mine, worked under lease and bond by Sullivan, Nuss & Co. A two-compartment shaft is down to the depth of 550 feet, with levels driven and some stoping done. The levels are tim-

bered with sets, the stopes with sets, and in places stulls are used and then filled in with waste, making the mine fairly well secured. Gives employment to 30 men, and the ore is treated at different places.

Gambetta mine, worked under lease by Richards, Stephens & Co. The shaft is down 500 feet, with levels driven. This mine was closed down for a time during the past year, and as the ground is heavy it forced the timbers out of place. The only work that was being done when I visited the mine was repairing the shaft and opening one of the levels, which was very necessary in order to work the mine properly. Connections which had been made from the 300 to the surface were closed in and could not be traversed. They employ fourteen men and had the ore treated at the different smelters around Butte. A cage and small engine was in use for hoisting.

Oneida mine, worked under lease by Heinzie & Co. A two-compartment shaft was down 250 feet, timbered with 8x8-inch timbers. At the 170 the ledge had been cut and drifted on and some stoping done, and were drifting on the 250-foot level. They employed 18 men. W. H. Wright, foreman.

The Estella mine is being worked under lease by the same company. They have built a large shaft-house and put in new hoisting machinery, and expected to build a smelter to treat the ore from these mines. At the 200-foot level the ledge has been cut and drifted on, and considerable stoping done. This level is connected with the workings of the Pacific mine. They were cutting a station at the 300. Give employment to 42 men in this mine.

Oro Butte mine, worked by W. L. Farlin. A two-compartment shaft is sunk 400 feet, timbered with 10x10-inch timbers. In one part of this shaft the timbers had taken weight and were forced some out of place. They evidently had not been blocked properly. The cage could barely pass. While it might do for the work being done there at present, in a permanent hoisting shaft, if much work were being done, or much hoisting going on, it would scarcely do.

At the 200-foot level some drifting had been done. On the 300 a place for a small station pump was cut. At the 400 a station was cut, and they were cross-cutting for the ledge. The cross-cuts and drifts are timbered with sets. There were no connections with the surface besides the main shaft. Give employment to 20 men. During the past year they have built a large shaft-house and put in a cage and hoisting machinery. A sinking pump and small station pump are in use to keep the water out. George Powell, foreman.

On the Cambers mine a two-compartment shaft was sunk to the depth of three hundred and twenty-five feet, and they were to continue sinking. This was all the work being done. They worked ten men. J. J. Cambers had charge of the mine.

The Dispatch mine is worked under lease and bond by N. B. Allen. An incline shaft is down three hundred and eighty feet, and is not very well timbered and is very narrow near the surface, and men coming up the shaft, when within a few feet of the surface, have to be very careful and not strike against the timbers on the hanging wall side. I called the foreman's attention to it, and also to the fact that there was no outlet but the shaft. The ledge had been drifted upon at the one hundred and seventy and two hundred and thirty-five foot levels, and some stoping had been done. Where timbers were put in, stulls and one-half sets were the kind used. A Blake sinking pump at the two hundred and thirty-five foot level and a Knowles at the bottom keeps the water out. A bucket, three-fourths inch rope and a small engine are used for hoisting. They work fifteen men, and the ore taken out of the mine is treated at the Butte Sampling Works. H. A. Richards is Foreman.

The Vulcan mine is owned and operated by the Bannister Mining Company. This property has been worked steadily for the past two years. A two compartment shaft was down 350 feet and were sinking it. It is timbered with 10x10 inch timbers. Stations are cut and drifts driven on the ledge and stoping out the ore was in progress. Connections have been made from the 300 to surface, and the ventilation was pretty good. The drifts are timbered with sets, the stopes with stulls, and then filled with waste which secured the mine. They give employment to forty-five men and the ore obtained from this mine is treated at different places. Col. E. D. Bannister, Superintendent, and C. Gates, Foreman.

The Ophir mine is owned and operated by the Ophir Mining Company. The shaft, a two compartment, is sunk to the depth of 270 feet with stations cut and levels driven down to and on the 250. Connections have been made to surface and the air was good. The levels are timbered with sets, the stopes with sets and half sets, and kept well filled with waste, making the mine pretty well secured. A station pump on the bottom level keeps the water out. Cage, one inch rope and 12x16 double cylinder engine for hoisting. They give employment to fifty men, and the ore is treated at the Butte Sampling Works. W. C. Kitto, Foreman, and F. G. Lamson, Superintendent.

The General Sheridan mine is worked under lease and bond by Olds and Harris. A two compartment shaft is sunk to the depth of one hundred feet, and the only work being done was crosscutting for the ledge on the 100-foot level, when I visited the mine. They work six men. George Masters, Foreman.

The Spur mine is worked by L. B. Olds, under lease and bond. This property has been worked at different times for the last ten years. Has been worked steadily by L. B. Olds for the past year. An incline shaft is down 300 feet, with the ledge drifted on at several places. Connections had been made from the 250 to surface, and they were raising to connect the 300 with the 250. The drifts are mostly timbered with sets, the stopes with stulls. The air was fairly good where the men were working. A Knowles sinking pump kept the water out. Bucket, $\frac{7}{8}$ inch rope and small engine for hoisting. Give employment to twelve men, and the ore is treated at the Lexington mill. Ben Casebeere, Foreman.

Ella mine. This mine has been worked for several years, principally by leasers. At present it is being worked under lease by Astle & Company. An incline shaft is down 170 feet, with the ledge drifted on at the 70, 120 and 170 foot levels, and some stoping done. Sets of small round timbers are put in the drifts. The stopes are timbered with half sets and stulls. Connections had been made to surface. They worked nine men. A bucket, small engine and $\frac{5}{8}$ inch rope were used for hoisting. The ore is treated at different places in Butte. William F. Sinsel, foreman.

Germania mine has been worked since April, 1890, by L. Frudenstein. The shaft, a two-compartment, is down 400 feet, with levels 100 feet apart. The levels are timbered with sets, the stopes with stulls, and in places half sets and sets are put in and then filled with waste. Connections have been made from the 300 to surface, and the air was fairly good. A Knowles sinking and Cameron station pumps for pumping the water. A cage, $\frac{7}{8}$ inch rope and 10x14 double cylinder engine for hoisting. This company worked thirty men and the most of the ore taken from this property is treated at the Butte Sampling Works. William Dittman, foreman.

Brittania mine, worked by the Brittania Mining Company. This property was worked some by leasers before the present company started to work it. This company has been working it since April. A two-compartment shaft is sunk to the depth of 150 feet, timbered with 8x8 inch timbers, and levels driven at 100 and 150 feet. The

levels are timbered with sets, the stopes with stulls and kept well filled with waste, making the mine pretty well secured. Connections have been made to surface, and the ventilation was fairly good. A Knowles sinking pump kept the water out. Bucket, $\frac{7}{8}$ inch rope and small engine for hoisting. Worked fifteen men and had the ore taken from the mine treated at the Butte Sampling Works. C. A. Carlson, foreman, and J. O. Hudnutt, superintendent.

Eveline mine is worked under lease by Wampler & Company. A two compartment shaft is down 150 feet with levels at the 100 and 150 foot. The work being done when I went through the mine was stoping. Sets are put in the drifts and stulls in the stopes, and the stopes were fairly well filled with waste. The air was pretty good.

A Blake's sinking pump kept the water out. A bucket, five-eighths inch rope and small engine are used for hoisting. They work fourteen men. The ore is treated at the different places around Butte.

Little St. Lawrence mine is worked under lease and bond by Pennell & Harris. A two compartment shaft was sunk to the depth of 112 feet, and they were drifting on the ledge. The shaft is timbered with eight by eight inch timbers and the drifts with sets.

Knowles sinker kept the water out. A bucket, three-fourths inch rope, and small engine are used for hoisting. They have started to sink a small shaft on the west end of the claim. They employed fourteen men. E. P. Pennell is foreman.

JOSEPH HOGAN,
Inspector of Mines.

BUTTE, MONT., December 14, 1892.

Joseph Hogan, Inspector of Mines:

SIR:—I have the honor of presenting herewith my annual report for the year 1892.

There were twenty-four fatal and twenty-one non-fatal accidents during the year. This report contains a brief account of the above stated accidents.

Yours, very respectfully,

JACOB OLIVER,

Deputy Inspector of Mines.

Fourth Annual Report

OF

DEPUTY INSPECTOR

REPORT

OF

DEPUTY INSPECTOR.

Thomas Temby, a miner, was seriously injured at the Gagnon mine, December 16, 1891. Temby was working on the eight hundred foot level, cleaning away for a set of timbers, when some ground fell from the hanging wall, breaking his leg and otherwise injuring him.

Jake Perry, a miner, was seriously injured at the Silver Bow mine, December 30, 1891. Perry was working on the three hundred foot level, and was in the act of cleaning away some dirt to stand a post, when some ground fell from the roof, striking him on the head and shoulders.

John Reive, a miner, died at the Modoc mine, January 19, 1892. Deceased was working on the three hundred foot level, in a raise seventy-five feet high. It seems that deceased had been working very hard all morning, working down the loose ground, and stopped very suddenly. His partner, who was engaged in tramming on the level below, called to him, and, receiving no answer, he procured help and went after him. They found him in a sitting position, with his back against the hanging wall, apparently dead. They immediately sent for medical assistance, and in the meantime they moved the deceased to the station and sent him on top. But it was of no avail, for he never regained consciousness. An inquest was held and a verdict of death from heart disease rendered.

Samuel Miles, a miner, was seriously injured at the Parrot mine, January 11, 1892. Miles and his partner were engaged in cleaning out a chute on the five hundred foot level, and while thus engaged, Miles was struck by a crowbar which his partner was using, knocking him to the bottom of the chute, a distance of sixty-five feet.

Tim Casey, a miner, was instantly killed at the Wake-Up-Jim mine, January 25, 1892. Deceased was working on the five hundred foot level, crosscutting from the station. Frank Devlin, his partner, had filled a car with dirt and Casey ran the car out to the station and into the shaft, and himself with it. An inquest was held and a verdict of death through carelessness rendered.

Thomas Rodgers, a miner, was fatally injured at the Hope mine, February 24, 1892, by being blasted. It seems that Rodgers was working alone, sub-leasing. Why or how he got blasted, no one could tell. It was supposed at the time that he had had a missed hole, and while in the act of reloading, it exploded. William Hocking, another leaser working near by, hearing the blast, hastened to the shaft and procured help, and took Rodgers to the hospital, where he died the following day. An inquest was held and a verdict of accidental death rendered.

Thomas Carroll and Frank Doyle, miners, were instantly killed at the Hige Ore mine, February 27, 1892, by falling rock, on the three hundred foot level. It seems that they had blasted a round of holes before going to dinner and on returning to their work after dinner were instantly caved on by a slab of rock falling from the hanging wall. An inquest was held and a verdict of accidental death was rendered.

Jeffery Kane, a laborer, was instantly killed at the St. Lawrence mine, February 27, 1892. It seems that Kane, who was working on the eight hundred foot level, was engaged in cleaning up the floor of the third stope when some rock fell from the floor of the fifth stope, crushing through two floors with the above stated result. An inquest was held and a verdict of accidental death was returned.

Jos. Sincock, a miner, was severely injured at the Parrott Mine, March 7, 1892. Sincock, at the time of the accident, was working on the five hundred foot level, stoping, when some ground fell from the breast, striking him on the leg and breaking it in three places.

Thomas Johns, a miner, was seriously injured at the Moose mine, March 8, 1892, by falling rock. Johns was working on the three hundred foot level, taking down some loose ground, after a blast, when some ground fell from the roof, striking him on the shoulders and back.

Thomas Jennings, a miner, was seriously injured at the Grey Rock mine, March 9, 1892, by falling rock. At the time of the acci-

dent Jennings was engaged working down some loose ground after a blast.

Larry Nangle, a miner was instantly killed at the Snow Drift mine, March 21, 1892, by being blasted. It seems that the deceased had loaded three holes and blasted. One of the holes missing fire he went back to reload it when it exploded with the above stated result. Inquest held and a verdict of accidental death rendered.

George Flick, a carman, was instantly killed at the Silver Bow mine, April 11, 1892. It seems that the deceased, who was working on the 300 foot level, wanted to go to the 400 foot level. He went to the station, it was supposed, to ring for the cage, when from some unknown reason he fell into the shaft, with the above stated result.

John J. Sullivan, a miner, was seriously injured at the Moose mine, April 12, 1892, by falling rock. Sullivan was working on the 300-foot level when some ground fell on him, striking him on the back.

One of the most deplorable accidents that ever happened in the State occurred at the Anaconda mine, May 14, 1892, by which nine unfortunate men lost their lives and five were seriously injured, caused by an immense cave between the 700 and 800 foot levels. The weight of the ground that fell was estimated at 15,000 tons. This accident was thoroughly investigated. In addition to myself and a coroner's jury, and by request of Mr. Daly, the general manager, a committee of six was appointed by the miners union of Butte to investigate this accident and to examine the mine and report as to its condition with regard to its working and timbering. This committee testified before the coroner's jury and exonerated the company from all blame. The names of the killed are Dan Sheehan, John Smith, Wm. Highland, Wm. Clarke, Quinn Leary, Tim C. Murphy, Seward Stewart, John Nardstrom and Jerry Harrington. The following named were injured: James Breen, Patrick J. Murphy, Frank Agazza, Robert Works and Mike F. Lanihan.

Patrick Hurley, a miner, was instantly killed at the High Ore mine, June 7, 1892. It seems that the deceased, whose duty it was to go through the mine between the shifts and see that the lights were all put out, had got as far as the 600-foot level and took the cage for the 700-foot level. Reaching the 700-foot level he rang one bell. The engineer instantly took the cage away, throwing him off with the above stated result.

Thomas Carr, a miner, was fatally injured at the Ground Squirrel

mine June 7, 1892. It seems that Carr, who was working in a drift had loaded two holes, and after firing them went back about a hundred feet, thinking it was safe, but when the holes exploded a rock from the blast struck him on the back with the above stated result.

James Phil, a miner, was instantly killed at the Gambetta mine June 17, 1892. It seems that the deceased, who was working on the 300-foot level, wanted to go on top. Went to the station and jumped on a full car on the cage. When the cage was about 40 feet from the surface, the rope broke with the above stated result. An inquest was held and a verdict of accidental death rendered.

Michael Lett, a miner, was seriously injured at the Anaconda mine, June 21, 1892. Lett was working over a chute on the 900-foot level, when some rock fell from the roof, knocking him into the chute.

Thomas Braun, a miner, was instantly killed at the Moscow mine, July 8, 1892, by falling rock. He was working on the third floor of the 200-foot level, making room for a set of timbers, when a huge boulder, weighing about three tons fell out of the side, striking him on the shoulder. Inquest held and a verdict of accidental death rendered.

W. H. Prisk was seriously injured at the Colusa mine, July 9, 1892, by falling rock.

Henry Young, a timberman was seriously injured at the Mountain Con. mine, July 12, 1892.³ He was working on the 200-foot level, putting in a set of timbers, and while lifting up a cap it overbalanced and fell striking him on the back.

Jos. Rule, a miner, was seriously injured at the Mountain View mine, August 8, 1892, by falling down a chute a distance of sixty feet.

Geo. Callings, a pump man, was instantly killed at the Anaconda mine, September 4, 1892, by being st-uck with the shoe of a bar. He was working in the shaft below the one thousand foot level, casing the pump shaft, when he was struck with the shoe of a machine bar that fell from the one thousand foot level. An inquest was held and a verdict of accidental death was rendered.

Thomas Davis and Ed. Jones, miners, were seriously injured at the Harris & Lloyd mine, September 4, 1892. They were both standing on a plank over a chute, when it broke, both falling to the bottom of the chute.

Geo. Erickson, a miner, was instantly killed at the St. Lawrence mine, September 11, 1892, by falling off a cage. Erickson was coming off shift, and riding through the shaft when, from an unknown reason, he fell off, with the above stated result. An inquest was held and a verdict of accidental death was returned.

Frank Maginley, a miner, was seriously injured at the Virginius mine, September 14, 1892. He was working on the two hundred foot level, and in going from one set to another, he stepped between the lagging and fell through.

Charles Irvine, a timberman, was seriously injured at the Virginius mine, September 15, 1892, by falling down a chute. It seems that Irvine and his partner were fixing a chute on the two hundred foot level, when he missed his footing and fell a distance of seventy-five feet.

Pat McCarty, a pumpman, was instantly killed at the Wake-Up-Jim mine, October 11, 1892, by being struck with a cage. It seems that McCarty was helping the shaftmen, who were working in the shaft at the time, to hang their lines, and was standing on one of the wall plates, when the cage, coming down the shaft, struck the deceased on the head. An inquest was held and a verdict of accidental death rendered.

Michael Foley, a miner, was instantly killed at the Green Mountain mine, October 19, 1892, by falling down a chute. It seems that the deceased, who was working on the two hundred foot level, had occasion to pass the chute, and when returning fell in, a distance of one hundred feet. An inquest was held and a verdict of accidental death returned.

JACOB OLIVER,

Deputy Inspector of Mines.

